

حمل الآن

مجاناً وحصرياً

# امتحانات رقم (1)

## الترم الاول





1

Cairo Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 If  $2^x = 8$  , then  $x^2 = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 9

2 The degree of the algebraic term  $4x^2y^3$  is  $\dots\dots\dots$

- (a) second. (b) third. (c) fourth. (d) fifth.

3 If the point  $(k - 2, 4)$  lies on the y-axis , then  $k = \dots\dots\dots$

- (a) 2 (b) 4 (c) 6 (d) 8

4 The middle proportional of the two quantities  $a, c$  is  $\dots\dots\dots$

- (a)  $\pm ac$  (b)  $\pm\sqrt{ac}$  (c)  $\frac{a+c}{2}$  (d)  $\frac{1}{2}ac$

5 The difference between the greatest value and the smallest value for a set of values is called the  $\dots\dots\dots$

- (a) range. (b) median.  
(c) arithmetic mean. (d) standard deviation.

6  $\mathbb{R} - \mathbb{Q} = \dots\dots\dots$

- (a)  $\mathbb{Z}$  (b)  $\mathbb{Q}$  (c)  $\emptyset$  (d)  $\mathbb{R}^+$

2 [a] Find the number which if added to each of the two terms of the ratio  $5 : 11$  , it becomes  $4 : 7$

[b] If  $X = \{1, 2, 3\}$  and  $Y = \{2, 3, 4, 5\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a + b = 5$ " for each  $a \in X, b \in Y$

- 1 Write  $R$  and represent it by an arrow diagram.  
2 Show that  $R$  is a function.

3 [a] Find the fourth proportional of the quantities :  $3, 5, 6$

[b] If  $X \times Y = \{(2, 1), (2, 4), (2, 5)\}$  , find :

- 1  $Y$  2  $Y \times X$  3  $n(Y^2)$

4 [a] If  $y$  varies inversely as  $x$  and  $y = 4$  when  $x = 3$

- 1 Write the relation between  $y$  and  $x$  2 Find the value of  $y$  when  $x = 6$

[b] If  $\frac{x}{2} = \frac{y}{3} = \frac{z}{5}$  , prove that :  $\frac{2x+y}{7} = \frac{2y+z}{11}$

- 5 [a]** Graph the curve of the function  $f : f(x) = (x - 3)^2$ , where  $x \in [1, 5]$ , from the graph find :

- 1** The equation of the axis of symmetry of the curve.  
**2** The minimum value of the function.

- [b]** Calculate the standard deviation for the values : 6 , 4 , 5 , 3 , 7

**2**

**Giza Governorate**



*Answer the following questions :*

- 1 Choose the correct answer :**

- 1** If  $2^x = 1$ , then  $x = \dots\dots\dots$   
 (a) zero (b) 1 (c) 2 (d) 3
- 2** If  $\sqrt{x} = 3$ , then  $x = \dots\dots\dots$   
 (a) 3 (b) 6 (c) 9 (d)  $\sqrt{3}$
- 3**  $\{2\} \times \{5\} = \dots\dots\dots$   
 (a)  $\{10\}$  (b)  $\{7\}$  (c)  $\{52\}$  (d)  $\{(2, 5)\}$
- 4** If  $xy = 5$ , then  $y \propto \dots\dots\dots$   
 (a)  $\frac{1}{x}$  (b)  $x$  (c)  $x + 5$  (d)  $\frac{x}{5}$
- 5** If  $\frac{a}{2} = \frac{b}{5} = \frac{2a+b}{k}$ , then  $k = \dots\dots\dots$   
 (a) 3 (b) 4 (c) 7 (d) 9
- 6** The range of the set of the values : 7 , 3 , 6 , 5 and 9 is  $\dots\dots\dots$   
 (a) 3 (b) 9 (c) 6 (d) 12

- 2 [a]** If  $\frac{x}{3} = \frac{y}{4} = \frac{c}{5}$ , then find the value of :  $\frac{2x+3y}{7c-2y}$

- [b]** If  $X = \{1, 2, 3, 4\}$ ,  $Y = \{1, 8, 9, 27, 64\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a^3 = b$ " for each  $a \in X$  and  $b \in Y$ , then :

- 1** Write  $R$  and represent it by an arrow diagram.  
**2** Is  $R$  a function ? and if the relation is a function, then find its range.

- 3 [a]** If  $y \propto x$  and  $y = 6$  when  $x = 2$ , then find :

- 1** The relation between  $y$  and  $x$  **2** The value of  $y$  when  $x = 5$

- [b]** If  $b$  is the middle proportional between  $a$  and  $c$

, then prove that :  $\frac{a-b}{a-c} = \frac{b}{b+c}$



4 [a] If  $(2x - 1, x + y) = (5, 8)$ , then find the value of  $y$

[b] If  $\frac{x-2y}{x+3y} = \frac{3}{5}$ , then find the value of  $x : y$

5 [a] Find the arithmetic mean and the standard deviation of the values :

2, 4, 6, 8

[b] Represent graphically the function  $f : f(x) = x^2 - 4x + 3$ , taking  $x \in [0, 4]$ , and from the graph find :

- 1 The minimum value of the function.
- 2 The equation of the axis of symmetry of the function.

3

Alexandria Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

- 1 The range of the set of values : 7, 3, 6, 9 and 5 equals .....  
 (a) 3 (b) 6 (c) 9 (d) 12
- 2 If  $a + 3b = 7$ ,  $c = 3$ , then the numerical value of the expression :  $a + 3(b + c) =$  .....  
 (a) 10 (b) 16 (c) 21 (d) 30
- 3  $2^x + 2^x =$  .....  
 (a)  $4^x$  (b)  $2^{2x}$  (c)  $2^{2x+1}$  (d)  $2^{x+1}$
- 4 If  $(x + 5, 8) = (1, 6y + x)$ , then  $x + y =$  .....  
 (a) 8 (b) -2 (c) -4 (d) 6
- 5 If  $x - y = 5$ ,  $x + y = 2$ , then  $x^2 - y^2 =$  .....  
 (a) 10 (b) 3 (c) 2 (d) 5
- 6 The third proportional of the two numbers 3, 6 is .....  
 (a)  $\frac{1}{2}$  (b) 9 (c) 2 (d) 12

2 [a] If  $X = \{0, 1, 2, 3\}$ ,  $Y = \{0, 1, 2, 3, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a = \frac{1}{2}b$ " for all  $a \in X, b \in Y$

- 1 Write  $R$  and represent it by an arrow diagram.
- 2 Show that  $R$  is a function, and why?

[b] If  $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$ , prove that :  $\frac{2y - z}{3x - 2y + z} = \frac{1}{2}$



3 [a] If  $f(x) = x^2 - 3x$  ,  $g(x) = x - 3$  , find :  $f(\sqrt{2}) + 3g(\sqrt{2})$

[b] Find the positive number which if its square is added to each of the two terms of the ratio 5 : 11 , it becomes 3 : 5

4 [a] Represent graphically the function  $f : f(x) = -x^2 - 2x$  where  $x \in [-4, 2]$  , from the graph deduce :

- 1 The coordinates of the vertex point of the curve.
- 2 The equation of the axis of symmetry.
- 3 The maximum value of the function.

[b] If a , b , c and d are continued proportional quantities , prove that :  $\frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$

5 [a] If  $y \propto \frac{1}{x}$  and  $y = 3$  when  $x = 2$  , find :

- 1 The relation between y and x
- 2 The value of y when  $x = 1.5$

[b] Calculate the standard deviation for the values : 13 , 14 , 17 , 19 , 22 (rounding the result to three decimal place).

4

El-Kalyoubia Governorate



Answer the following questions :

1 Choose the correct answer from the given ones :

1 If  $X = \{2\}$  ,  $Y = \{3, 4\}$  , then  $n(X^2) \times n(Y) = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 4

2 If  $2^{x-4} = \frac{1}{16}$  , then  $x = \dots\dots\dots$

- (a) 0 (b)  $\frac{1}{4}$  (c)  $\frac{1}{3}$  (d)  $\frac{1}{2}$

3 The middle proportional between the two numbers 3 and 12 is  $\dots\dots\dots$

- (a)  $\pm 3$  (b)  $\pm 4$  (c)  $\pm 6$  (d)  $\pm 12$

4 The solution set of the equation :  $x - 1 = |-1|$  in  $\mathbb{N}$  is  $\dots\dots\dots$

- (a)  $\{0\}$  (b)  $\{1\}$  (c)  $\{2\}$  (d)  $\emptyset$

5 If  $-1 < x < 3$  ,  $x \in \mathbb{R}$  , then  $(x + 1) \in \dots\dots\dots$

- (a)  $\{0, 3\}$  (b)  $[-1, 3[$  (c)  $\{0, 4\}$  (d)  $]0, 4[$

- 6** The positive square root of the average of squares of deviations of the values from mean is called the .....
- (a) range. (b) arithmetic mean.  
(c) standard deviation. (d) mode.
- 
- 2** [a] If  $X = \{2, -1\}$ ,  $Y = \{-1, 5\}$ ,  $Z = \{2, 3\}$   
 , find : **1**  $X \times Y$  **2**  $(X - Y) \times Z$
- [b] If  $y \propto X$  and  $y = 5$  when  $X = 15$ , find :  
**1** The relation between  $X$  and  $y$  **2** The value of  $y$  when  $X = 30$
- 
- 3** [a] If  $X = \{-4, -2, 0, 2, 4\}$  and  $R$  is a relation on  $X$  where " $aRb$ " means " $a$  is the additive inverse of  $b$ " where  $a \in X$ ,  $b \in X$ , write  $R$  and represent it by an arrow diagram and show if  $R$  is a function or not.
- [b] If  $\frac{a}{b} = \frac{c}{d}$ , prove that :  $\frac{a+b}{c+d} = \frac{b}{d}$
- 
- 4** [a] Find the number that if added to each of the two terms of the ratio  $7 : 11$ , then it becomes  $4 : 5$
- [b] If  $2, a, b, 54$  are in continued proportion, find the value of :  $a + b$
- 
- 5** [a] Graph the function  $f : f(X) = X^2 + 2X - 3$ , taking  $X \in [-4, 2]$ , then find :  
**1** The minimum value of the function.  
**2** The equation of the axis of symmetry.
- [b] Calculate the arithmetic mean and the standard deviation of the values :  
 $12, 13, 16, 18, 21$

**5****El-Sharkia Governorate**

**Answer the following questions : (Calculator is allowed)**

- 1** Choose the correct answer from those given :
- 1** If  $Xy = 3$ , then  $X \propto$  .....
- (a)  $y$  (b)  $\frac{1}{y}$  (c)  $y^2$  (d)  $\frac{1}{y^2}$
- 2** If the point  $(k - 2, 3k - 2)$  is at a distance of 4 length units from  $X$ -axis, then  $k =$  .....
- (a) 0 (b) 1 (c) 2 (d) 3

## Algebra and Statistics

3 If  $a : b = 2 : 3$  ,  $b : c = 5 : 6$  , then  $a : c = \dots\dots\dots$

- (a) 1 : 3                      (b) 3 : 5                      (c) 2 : 3                      (d) 5 : 9

4 If the standard deviation for some values = 3 and the number of these values = 2 , then  $\sum (X - \bar{X})^2 = \dots\dots\dots$

- (a) 1                      (b) 18                      (c) 12                      (d) 24

5 The result of  $\frac{3^{2X} + 3^{2X} + 3^{2X}}{3^X \times 3^X}$  in the simplest form is  $\dots\dots\dots$

- (a)  $3^4 X$                       (b)  $3^2 X$                       (c) 3                      (d)  $\frac{1}{3}$

6 If the straight line which represents the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  where  $f(X) = 2X + 3 + c$  passes through the origin point , then  $c = \dots\dots\dots$

- (a) -2                      (b) -3                      (c) 0                      (d) 3

2 [a] If  $\frac{a}{3} = \frac{b}{2} = \frac{c}{5}$  , prove that :  $\frac{a - 2b + 3c}{2a + b + c} = \frac{14}{13}$

[b] If  $(X - Y) \times Y = \{(1, 2), (1, 3)\}$  ,  $n(X \times Y) = 6$  , find : 1  $X, Y$                       2  $(X \cap Y) \times Y$

3 [a] If  $y = a + 2$  ,  $a \propto X$  , write the relation between  $a$  and  $X$  when  $X = 2$  and  $a = 4$  , then find  $y$  at  $X = 1$

[b] If  $X = \{a : a \in \mathbb{Z}, -2 \leq a \leq 2\}$  and  $R$  is a relation on  $X$  where " $aRb$ " means " $a$  is the additive inverse of  $b$ " for all  $a \in X, b \in X$  , write  $R$  and represent it by an arrow diagram , and show if  $R$  is a function or not , give reason.

4 [a] If  $a, b, c$  and  $d$  are in continued proportion

, prove that :  $\frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$

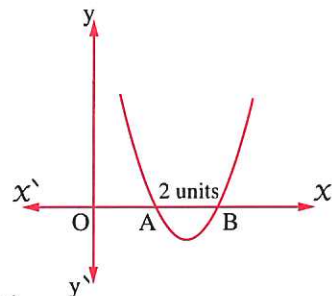
[b] In the opposite figure :

$f$  is a quadratic function

where  $f(X) = X^2 - 6X + m$

, the length of  $AB = 2$  unit length.

find the value of  $m$  , then find the minimum value of the function.



5 [a] Find the number which if added to each of the numbers 3 , 5 , 8 , 12 , it will make them proportional.

[b] Calculate the mean and the standard deviation for the values : 12 , 13 , 16 , 18 , 21



6

El-Gharbia Governorate



Answer the following questions :

1 Choose the correct answer from the given ones :

- 1 If  $(2^x, \sqrt{y}) = (1, 1)$ , then  $x - y = \dots\dots\dots$   
 (a) zero (b) 1 (c) -1 (d)  $\pm 1$
- 2 If  $X = \{1, 3\}$ , then  $n(X^2) = \dots\dots\dots$   
 (a) 2 (b) 4 (c) 3 (d) 10
- 3 If  $f(x) = 1$ , then  $f(1) + f(2) = \dots\dots\dots$   
 (a) 1 (b) 2 (c) 3 (d) 4
- 4  $[-1, 3] \cap \{-3, -1\} = \dots\dots\dots$   
 (a)  $\emptyset$  (b)  $\{-3\}$  (c)  $\{-1\}$  (d)  $\{3\}$
- 5 If  $xy = 3$ , then  $y \propto \dots\dots\dots$   
 (a)  $x^{-1}$  (b)  $x$  (c)  $3x$  (d)  $x^2$
- 6 Half the number  $4^{20} = \dots\dots\dots$   
 (a)  $2^{20}$  (b)  $2^{29}$  (c)  $2^{19}$  (d)  $2^{39}$

2 [a] If  $X = \{1, 2, 3\}$ ,  $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a$  is the multiplicative inverse of  $b$ " for each  $a \in X$ ,  $b \in Y$ , write  $R$  and represent it by an arrow diagram, show if  $R$  is a function or not, and why?

[b] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$

3 [a] If  $y$  varies inversely as  $x$ , and  $y = 10$  when  $x = 3$ , find the relation between  $y$  and  $x$ , then find also  $y$  when  $x = 5$

[b] Represent graphically the function  $f : f(x) = (x - 2)^2$ ,  $x \in [0, 4]$ , from the graph deduce :

- 1 The coordinates of the vertex point of the curve.  
 2 The equation of the axis of symmetry.

4 [a] Find the number which if we add it to each term of the ratio  $3 : 7$ , it becomes  $1 : 2$

[b] If  $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$ , find : 1  $X, Y$  2  $Y \times X$  3  $X^2$

**5 [a]** If  $5a = 3b$ , then find :  $(7a + 9b) : (4a + 2b)$

**[b]** Calculate the mean and the standard deviation for the data : 4 , 8 , 12 , 10 , 6  
(rounding the result to one decimal place).

**7**

**El-Dakahlia Governorate**



*Answer the following questions : (Calculator is permitted)*

**1 [a]** Choose the correct answer :

**[1]** The range of the set of values : 23 , 22 , 15 , 18 , 17 is .....

(a) 8 (b) 18 (c) 19 (d) 23

**[2]** If  $f(x) = 2x - 1$ ,  $g(x) = 4$ , then  $f(g(x)) = \dots\dots\dots$

(a) 7 (b) 4 (c) -4 (d) -7

**[3]** If  $X = \{a, a^3\}$ , then  $a$  may be equal to .....

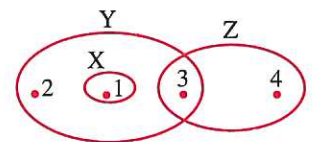
(a) -1 (b) zero (c) 1 (d) 2

**[b]** In the opposite figure :

By using Venn diagram which  
represents the sets  $X$ ,  $Y$  and  $Z$

, find : **[1]**  $(X \cap Y) \times Z$

**[2]**  $(X \cup Y) \times (Z - Y)$



**2 [a]** Choose the correct answer :

**[1]** If 10 grams of chocolate give 300 calories, then the number of calories which are found in 30 grams of the same chocolate equals .....

(a) 90 (b) 100 (c) 900 (d) 9000

**[2]** The ratio between the circumference of the circle : the length of its diameter = .....

(a)  $\pi : 1$  (b)  $1 : \pi$  (c)  $2\pi : 1$  (d)  $1 : 2\pi$

**[3]** If  $\frac{a}{b} = \frac{3}{5}$ ,  $5a - 2b = 20$ , then  $b = \dots\dots\dots$

(a) 3 (b) 5 (c) 15 (d) 20

**[b]** If  $b$  is the middle proportional between  $a$  and  $c$

, prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

**3 [a]** Find the standard deviation for the values : 5 , 6 , 7 , 8 , 9

**[b]** If  $X = \{-1, 0, 1\}$  and  $R$  is a relation on  $X$  where " $aRb$ " means " $b = a^2$ " for each  $a \in X, b \in X$ , write  $R$  and show with reason if  $R$  is a function or not, and if  $R$  is a function, mention its range.

**4 [a]** If  $\frac{x+y}{9} = \frac{y+z}{7}$ , prove that :  $\frac{x-z}{x+2y+z} = \frac{1}{8}$

**[b]** A car moves with uniform velocity where the distance varies directly with the time. If the car covered a distance of 150 km. in 6 hours, find the distance covered by that car in 10 hours.

**5 [a]** If  $x^4 y^2 - 14x^2 y + 49 = 0$ , prove that :  $y$  varies inversely with  $x^2$

**[b]** In the opposite figure :

The curve represents

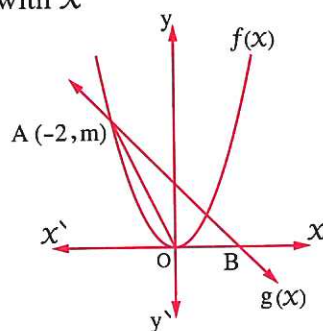
the quadratic function  $f : f(x) = x^2$

,  $\overleftrightarrow{AB}$  represents the linear function  $g : g(x) = k - x$

If  $A(-2, m)$

, find : **1** The values of  $k, m$

**2** The area of  $\triangle AOB$



## 8 Kafr El-Sheikh Governorate



Answer the following questions : (Calculators are permitted)

**1** Choose the correct answer from the given ones :

**1** The multiplicative inverse of 2 is .....

- (a) -2                      (b)  $-\frac{1}{2}$                       (c)  $\frac{1}{2}$                       (d) 2

**2** If  $n(X) = 5$ ,  $n(X \times Y) = 10$ , then  $n(Y) = \dots\dots\dots$

- (a) 2                      (b) 3                      (c) 4                      (d) 5

**3** The degree of the algebraic term  $3xy^2$  is ..... degree.

- (a) the second                      (b) the third                      (c) the fourth                      (d) the fifth

**4** If  $xy = 5$ , then  $y \propto \dots\dots\dots$

- (a)  $x$                       (b)  $\frac{1}{x}$                       (c)  $5x$                       (d)  $\frac{1}{5}x$

**5** Half of the number  $4^{10}$  is .....

- (a)  $2^5$                       (b)  $2^{10}$                       (c)  $2^{19}$                       (d)  $4^5$



## Algebra and Statistics

6 ..... is one of the measures of the dispersions.

- (a) The arithmetic mean                      (b) The median  
(c) The mode                                      (d) The range

2 [a] If  $X = \{1, 3, 4, 5\}$ ,  $Y = \{1, 2, 3, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a + b = 7$ " for all  $a \in X$ ,  $b \in Y$

1 Write  $R$  and represent it by an arrow diagram.

2 Show if  $R$  is a function or not, and why?

[b] If  $\frac{a}{b} = \frac{3}{5}$ , find the value of:  $\frac{4a + 2b}{7a + 9b}$

3 [a] If  $a$ ,  $b$ ,  $c$  and  $d$  are proportional, prove that:  $\frac{a-b}{c-d} = \frac{a}{c}$

[b] If  $y \propto X$  and  $y = 10$  when  $X = 5$ , find:

- 1 The relation between  $X$  and  $y$   
2 The value of  $y$  when  $X = 3$

4 [a] Calculate the arithmetic mean and the standard deviation for the values: 15, 9, 7, 6, 3

[b] If  $f(X) = 2X + c$  and  $f(1) = 7$

- 1 Find the value of  $c$                                       2 Find the value of  $f(2)$

5 [a] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that:  $\frac{b^2 + c^2}{a^2 + b^2} = \frac{c}{a}$

[b] Represent graphically the function  $f: f(X) = X^2 - 4$ , where  $X \in [-3, 3]$ , from the graph deduce the vertex of the curve.

9

El-Beheira Governorate



Answer the following questions: (Calculator is permitted)

1 Choose the correct answer from the given ones:

1 If  $n(X) = 3$ ,  $n(X \times Y) = 12$ , then  $n(Y) = \dots\dots\dots$

- (a) 9                                      (b) 4                                      (c) 15                                      (d) 36

2 If  $3a - 4b = 0$ , then  $\frac{a}{b} = \dots\dots\dots$

- (a)  $\frac{3}{4}$                                       (b)  $\frac{-3}{4}$                                       (c)  $\frac{4}{3}$                                       (d)  $\frac{-4}{3}$

3 The range of the set of the values: 7, 3, 6, 9 and 5 equals  $\dots\dots\dots$

- (a) 3                                      (b) 4                                      (c) 6                                      (d) 5

- 4 The solution set of the equation :  $(X - 1)^2 = 9$  in  $\mathbb{R}$  is .....
- (a)  $\{4\}$  (b)  $\{-2\}$  (c)  $\{4, -2\}$  (d)  $\{3\}$
- 5 If  $\frac{y}{x} = 5$  where  $x \neq \text{zero}$  , then  $y \propto$  .....
- (a)  $x$  (b)  $x - 5$  (c)  $x + 5$  (d)  $\frac{1}{x}$
- 6 If  $x^3 = 27$  ,  $\sqrt{y} = 3$  , then  $x + y =$  .....
- (a) 6 (b) 9 (c) 30 (d) 12

2 [a] Find the positive number which if we add its square to each of the terms of the ratio 5 : 7 , it becomes 7 : 8

[b] If  $X = \{2, 3, 4\}$  ,  $Y = \{6, 9, 12, 15\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $3a = b$ " for each  $a \in X$  ,  $b \in Y$  , write  $R$  and represent it by an arrow diagram , show that  $R$  is a function from  $X$  to  $Y$

3 [a] If  $y \propto x$  and  $y = 6$  when  $x = 3$  , find the relation between  $y$  and  $x$  , the value of  $y$  when  $x = 5$

[b] If  $\frac{x}{2} = \frac{y}{5} = \frac{z}{7}$  , prove that :  $\frac{5y - 3z}{2z - 3x} = \frac{1}{2}$

4 [a] If  $X = \{3, 4\}$  ,  $Y = \{4, 5\}$  ,  $Z = \{5, 6, 7\}$  , find :

1  $X \times (Y \cap Z)$

2  $(X - Y) \times Z$

3  $n(Z^2)$

[b] If  $b$  is the middle proportional between  $a$  and  $c$  , prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

5 [a] Calculate the standard deviation for the following values : 16 , 32 , 5 , 20 , 27

[b] Represent graphically the function  $f : f(x) = (x - 2)^2$  , where  $x \in [-1, 5]$  , from the graph find :

1 The vertex of the curve.

2 The minimum value of the function and the equation of the axis of symmetry.

10

El-Menia Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from the given ones :

- 1 If  $m$  represents a negative number , which of the following represents a positive number ?
- (a)  $m^3$  (b)  $m^2$  (c)  $2m$  (d)  $\frac{m}{2}$

- 2 ..... is one of the measures of the dispersions.
- (a) The median (b) The arithmetic mean  
(c) The standard deviation (d) The mode
- 3 If the total cost of a trip is (y) , some of it is constant (a) and the other is directly proportional with the number of participants (X) , then ..... (m is a constant  $\neq 0$ )
- (a)  $y = a X$  (b)  $y = \frac{a}{X}$  (c)  $y = a + \frac{m}{X}$  (d)  $y = a + m X$
- 4 If  $2^X = \frac{1}{8}$  , then  $X =$  .....
- (a)  $\frac{1}{2}$  (b)  $\frac{1}{3}$  (c) 3 (d) -3
- 5 If  $X - y = 5$  ,  $X + y = \frac{1}{5}$  , then  $X^2 - y^2 =$  .....
- (a)  $\frac{1}{25}$  (b) 1 (c) 25 (d) 5
- 6 If the point  $(X - 4 , 2 - X)$  is located in the third quadrant , where  $X \in \mathbb{Z}$  , then  $X =$  .....
- (a) 2 (b) 3 (c) 4 (d) 6

- 2 [a] If  $X = \{1, 2, 3\}$  ,  $Y = \{1, 3, 6, 9, 12\}$  and R is a relation from X to Y where "aRb" means " $a = \frac{1}{3} b$ " for each  $a \in X$  ,  $b \in Y$
- 1 Write R and represent it by an arrow diagram.  
2 Is R a function ? And why ?
- [b] If  $y \propto X$  and  $y = 14$  when  $X = 42$  , find :
- 1 The relation between y and X      2 The value of y when  $X = 60$

- 3 [a] If the straight line which represents the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  where  $f(X) = 4X + a$  intersects the X-axis at the point  $(2, b)$  , find the value of each of : a , b
- [b] Calculate the standard deviation of the values : 8 , 9 , 7 , 6 and 5

- 4 [a] If b is the middle proportional between a and c

, prove that :  $\left(\frac{b-c}{a-b}\right)^2 = \frac{c}{a}$

[b] If  $X^4 y^2 - 14 X^2 y + 49 = 0$  , prove that :  $y \propto \frac{1}{X^2}$

- 5 [a] If  $a : b = 3 : 5$  , find the ratio :  $20a - 7b : 15a + b$

- [b] Represent the function  $f : f(X) = X^2 - 2$  graphically taking  $X \in [-3, 3]$  , and from the graph , deduce the coordinates of the vertex of the curve and the maximum or minimum value of the function.



11

Souhag Governorate



Answer the following questions : (Calculator is allowed)

**1 Choose the correct answer :**

- 1** If  $|X| - 4 = 3$ , then  $X = \dots\dots\dots$   
 (a) 7 (b) -7 (c)  $\pm 7$  (d) 1
- 2** If  $f(X) = 3$ , then  $f(5) + f(-5) = \dots\dots\dots$   
 (a) 6 (b) 1 (c) zero (d) -1
- 3**  $\sqrt[3]{125} + \sqrt[3]{\dots\dots\dots} = \sqrt{64}$   
 (a) 8 (b) 3 (c) 9 (d) 27
- 4** If  $XY = 5$ , then  $y$  changes inversely with  $\dots\dots\dots$   
 (a)  $\frac{1}{X}$  (b)  $X$  (c)  $5X$  (d)  $\frac{X}{5}$
- 5** If  $X^2 + y^2 = 25$ ,  $XY = 12$ , then  $(X - y)^2 = \dots\dots\dots$   
 (a) 1 (b) 5 (c) 13 (d) 37
- 6** If all the individuals are equal in value, then  $\dots\dots\dots$   
 (a)  $\bar{X} - X > 0$  (b)  $\bar{X} - X < 0$  (c)  $\sigma = 0$  (d)  $\bar{X} = 0$

**2 [a] If  $X = \{3\}$ ,  $Y = \{4, 5\}$ ,  $Z = \{6, 5\}$ , find :**

- 1**  $(X \cap Y) \times Z$       **2**  $X \times (Y - Z)$       **3**  $n(X^2)$

**[b] If  $\frac{X-3y}{X+2y} = \frac{2}{3}$ , find the value of :  $\frac{X}{y}$**

**3 [a] If  $a, b, c$  and  $d$  are proportional quantities, prove that :  $\frac{3a-2c}{5a+3c} = \frac{3b-2d}{5b+3d}$**

**[b] If  $X = \{0, 1, 2, \frac{1}{2}\}$  and  $R$  is a relation on  $X$  where " $aRb$ " means " $a$  is the multiplicative inverse of  $b$ " for all  $a \in X, b \in X$**

- 1** Write  $R$  as a set of ordered pairs, then represent it by an arrow diagram.  
**2** Show that  $R$  is a function or not? Why?

**4 [a] If  $a, 2, 4, b$  are in continued proportion, find :  $a + b$**

**[b] Represent the function  $f : f(X) = (X + 1)^2$  where  $X \in [-4, 2]$  and from the graph deduce :**

- 1** The coordinates of the vertex of the curve.  
**2** The maximum or the minimum value of the function.  
**3** The equation of the axis of symmetry.

**5 [a]** If  $y \propto X$  and  $y = 20$  when  $X = 4$ , find :

- 1** The relation between  $y$  and  $X$
- 2** The value of  $X$  when  $y = 40$

**[b]** The following table represents the frequency distribution of the ages of 10 children :

Ages in years	5	8	9	10	12	Total
No. of children	1	2	3	3	1	10

Calculate the standard deviation to ages in years.

**12**

**Qena Governorate**



**Answer the following questions : (Calculators are permitted)**

**1** Choose the correct answer from those given :

- 1** If  $X, Y$  are two sets non empty and  $n(X) = 2$ ,  $n(Y^2) = 9$ , then  $n(X \times Y) = \dots\dots\dots$ 
  - (a) 3
  - (b) 4
  - (c) 6
  - (d) 18
- 2**  $[-2, 3] - \{-2, 5\} = \dots\dots\dots$ 
  - (a)  $[-2, 3[$
  - (b)  $]-2, 3[$
  - (c)  $]-2, 5[$
  - (d)  $]-2, 3]$
- 3** If  $y \propto X$  and  $X = 3$  when  $y = 2$ , then the constant proportional equals  $\dots\dots\dots$ 
  - (a) 2
  - (b) 3
  - (c)  $\frac{2}{3}$
  - (d) 6
- 4**  $(\sqrt{3} - 1)^2 = \dots\dots\dots$ 
  - (a)  $4 - 2\sqrt{3}$
  - (b)  $\sqrt{2}$
  - (c) 2
  - (d)  $2\sqrt{3} + 1$
- 5** If the standard deviation for the values :  $X + 1, y, 4$  equals zero, then  $Xy = \dots\dots\dots$ 
  - (a) 4
  - (b) 12
  - (c) 16
  - (d) 20
- 6** The sum of all real numbers in the interval  $]-2, 2]$  equals  $\dots\dots\dots$ 
  - (a) 2
  - (b) -2
  - (c) zero
  - (d) can not sum

**2 [a]** If  $X = \{-2, -1, 0, 1, 2, 3\}$  and  $R$  is a relation on  $X$  where " $aRb$ " means " $a$  is the additive inverse of  $b$ " for each  $a \in X, b \in X$ , write  $R$  and show it by an arrow diagram.

Is  $R$  a function or not ? And if it is a function, find its range.

**[b]** If  $b$  is the middle proportional between  $a, c$ , then prove that :  $\frac{a^3 + b^3}{b^3 + c^3} = \frac{a^2}{bc}$

**3 [a]** If the straight line showing the function  $f : f(X) = 2X - b$  intersects  $X$ -axis at the point  $(1, a - 3)$ , then find the values of :  $a, b$

**[b]** If  $a, b, c$  and  $d$  are proportional quantities, prove that :  $\frac{a+b}{b} = \frac{c+d}{d}$

- 4 [a] If  $y \propto \frac{1}{x}$  and  $y = 3$  when  $x = 2$ , then find the relation between  $x$  and  $y$ , then find the value of  $y$  when  $x = 1.5$

[b] Find the mean and the standard deviation for the following values : 3 , 6 , 4 , 7 , 5

- 5 [a] If  $\frac{x}{y} = \frac{2}{3}$ , then find the value of :  $\frac{3x + 2y}{6y - x}$

[b] Represent graphically the function  $f : f(x) = 3 - x^2$ . Let  $x \in [-2, 2]$ , from the graph find the vertex of the curve, the maximum or minimum value of the function and the equation of the axis of symmetry.

13

Aswan Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

[1] If  $2x = 5$ , then  $y \propto$  .....

(a)  $\frac{1}{x}$

(b)  $x - 5$

(c)  $x$

(d)  $x + 5$

[2]  $2^3 \times 2^5 =$  .....

(a)  $2^{15}$

(b)  $2^2$

(c)  $4^8$

(d)  $2^8$

[3] The range of the set of values : 7 , 3 , 6 , 5 and 9 equals .....

(a) 3

(b) 5

(c) 6

(d) 7

[4]  $\frac{1}{2} + \frac{1}{4} =$  ..... %

(a)  $\frac{1}{4}$

(b)  $\frac{1}{2}$

(c)  $\frac{3}{4}$

(d) 75

[5] If  $(3, b - 1)$  lies on  $x$ -axis, then  $b =$  .....

(a) 3

(b) -3

(c) -1

(d) 1

[6]  $[2, 5] \cup \{2\} =$  .....

(a)  $[2, 5[$

(b)  $[2, 5]$

(c)  $\{2\}$

(d)  $[2, 5]$

- 2 [a] If  $X = \{2, 3, 4\}$ ,  $Y = \{2, 3, 4, 5, 6, 7, 8\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a = \frac{1}{2}b$ " for each  $a \in X, b \in Y$

[1] Write  $R$  and represent it by an arrow diagram.

[2] Show that  $R$  is a function from  $X$  to  $Y$  and find its range.

[b] If  $y \propto \frac{1}{x}$  and  $y = 6$  when  $x = 2$ , find :

[1] The relation between  $x$  and  $y$

[2] The value of  $y$  when  $x = 3$



- 3 [a]** Represent graphically the quadratic function  $f$  where  $f(x) = x^2 + 2x + 1$ , taking  $x \in [-4, 2]$  and from the graph deduce the coordinates of the vertex of the curve, the maximum or minimum value of the function and the equation of the symmetry axis.

**[b]** If  $b$  is the middle proportional between  $a$  and  $c$

, prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

- 4 [a]** If  $f(x) = x^2 - 3x$ ,  $g(x) = x - 3$ , prove that :  $f(3) = g(3)$

**[b]** If  $\frac{a}{b} = \frac{3}{5}$ , then find the value of :  $\frac{7a + 9b}{4a + 2b}$

- 5 [a]** If  $X = \{1\}$ ,  $Y = \{2, 3\}$ ,  $Z = \{2, 5, 6\}$

, find : **1**  $n(Y^2)$

**2**  $X \times (Y \cap Z)$

**[b]** Calculate the mean and the standard deviation for the following values :  
12, 13, 16, 18, 21

14

South Sinai Governorate



**Answer the following questions :**

- 1** Choose the correct answer from those given :

**1** The solution set of the equation :  $x^2 + 9 = 0$  in  $\mathbb{R}$  is .....

(a)  $\emptyset$

(b)  $\{3\}$

(c)  $\{-3\}$

(d)  $\{-3, 3\}$

**2**  $\sqrt[3]{4 - \sqrt[3]{64}} = \dots\dots\dots$

(a)  $-4$

(b)  $-2$

(c)  $2$

(d)  $4$

**3** If  $(a, b + 1) = (5, -9)$ , then  $a + b = \dots\dots\dots$

(a)  $15$

(b)  $10$

(c)  $9$

(d)  $-5$

**4** If  $x = 5y$ , then  $x \propto \dots\dots\dots$

(a)  $y$

(b)  $\frac{1}{y}$

(c)  $\frac{5}{y}$

(d)  $\frac{y}{5}$

**5** The range for the values : 7, 15, 25, 19 equals .....

(a)  $15$

(b)  $18$

(c)  $19$

(d)  $25$

**6** If  $X = \{1, 3, 4\}$ ,  $Y = \{5, 7\}$ , then  $n(X \times Y) = \dots\dots\dots$

(a) zero

(b)  $2$

(c)  $3$

(d)  $6$

- 2 [a]** If  $X = \{-1, 2\}$ ,  $Y = \{3, 2\}$ ,  $Z = \{4, 6, 8\}$ , find :  $(X - Y) \times Z$

**[b]** If  $y^2 - 10xy + 25x^2 = 0$ , prove that :  $y \propto x$

- 3 [a]** Find the number which if its square is added to each of the two terms of the ratio 7 : 11 , it becomes 4 : 5
- [b]** If  $X = \{1, 2, 3\}$  ,  $Y = \{-1, -2, -3\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a$  is the additive inverse of  $b$ " for all  $a \in X$  ,  $b \in Y$  , write  $R$  as a set of ordered pairs , showing if it is a function or not and represent it by an arrow diagram.

- 4 [a]** If  $y$  varies inversely as  $X$  and  $X = 3$  at  $y = 2$  , find the relation between  $X$  and  $y$  , then find the value of  $X$  when  $y = 6$

- [b]** The following table shows the marks of 20 students in an algebraic exam :

The marks	0	1	2	3	4	5	Total
Frequency	1	3	5	6	3	2	20

Calculate the standard deviation for these marks.

- 5 [a]** Represent graphically the function  $f : f(X) = X^2 - 4$  ,  $X \in [-3, 3]$  and from the graph deduce the vertex of the curve and the equation of the axis of symmetry.

- [b]** If  $a$  ,  $b$  ,  $c$  and  $d$  are in continued proportion

, prove that :  $\frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$

**15**

Matrouh Governorate



*Answer the following questions : (Calculator is allowed)*

- 1** Choose the correct answer from the given ones :

- [1]** The range of the set of values : 7 , 3 , 6 , 9 and 5 is .....

(a) 3 (b) 4 (c) 6 (d) 12

- [2]** If  $X = \{3\}$  , then  $X^2 = \dots\dots\dots$

(a)  $\{9\}$  (b) 9 (c)  $\{(3, 3)\}$  (d)  $\{3, 3\}$

- [3]** The algebraic term  $4abc$  is of the ..... degree.

(a) first (b) third (c) fourth (d) seventh

- [4]** If the straight line representing the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  where  $f(X) = 4X - 5$  passes through the point  $(a, 3)$  , then  $a = \dots\dots\dots$

(a) -3 (b) -2 (c) 2 (d) 4

- [5]** The fourth proportional of the quantities 3 , 6 and 6 is .....

(a) 3 (b) 6 (c) 9 (d) 12

6  $\sqrt{25} = \dots\dots\dots$

(a)  $-5$

(b)  $|5|$

(c)  $\pm 5$

(d)  $625$

- 2 [a] If  $X = \{2, 4, 6\}$ ,  $Y = \{1, 2, 3, 5\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a = 2b$ " for each  $a \in X$ ,  $b \in Y$

1 Write  $R$  and represent  $R$  by an arrow diagram.

2 Is  $R$  a function from  $X$  to  $Y$  or not? Why? And find the range.

[b] If  $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - 2b + 5c}{3x}$ , then find the value of :  $x$

- 3 [a] If  $X \times Y = \{(1, 2), (4, 2), (5, 2)\}$   
 , find : 1  $X$       2  $Y \times X$       3  $n(X^2)$

[b] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$

- 4 [a] Calculate the arithmetic mean and the standard deviation of the following data :  
 6, 8, 10, 12 and 14

[b] If  $y$  varies inversely as  $x$  and  $y = 3$  when  $x = 2$

, find : 1 The relation between  $y$  and  $x$

2 The value of  $y$  when  $x = 6$

- 5 [a] If  $(a - 3, 7) = (2, b^3 - 1)$

, find :  $\frac{a + 2b}{2a - b}$

[b] Graph the curve of the function  $f : f(x) = 1 - x^2$ , where  $x \in [-2, 2]$   
 and from the graph find :

1 The coordinates of the vertex of the curve.

2 The maximum or minimum value of the function.

3 The equation of the symmetry axis.

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# Examinations on Port Said Specifications



## on Algebra and Statistics

Exam

1

Port Said 2023

### First Multiple choice questions

Choose the correct answer from those given :

1  $\sqrt{50} - \sqrt{8} = \dots\dots\dots$

(a)  $\sqrt{42}$

(b)  $\sqrt{58}$

(c)  $3\sqrt{2}$

(d)  $2\sqrt{5}$

2 If  $X = \{2\}$  , then  $X^2 = \dots\dots\dots$

(a) 4

(b)  $\{4\}$

(c) (2 , 2)

(d)  $\{(2 , 2)\}$

3  $f : f(X) = X^4 - 2X^3 + 7$  is a polynomial function of the ..... degree.

(a) first

(b) second

(c) third

(d) fourth

4 If 3 , 6 and  $X$  are proportional quantities , then  $X = \dots\dots\dots$

(a) 9

(b) 12

(c) 15

(d) 18

5 The range of the set of values 7 , 3 , 6 , 9 , 5 is .....  
(a) 3 (b) 4 (c) 6 (d) 12

6 If  $\frac{X}{5} = \frac{y}{4} = \frac{X+2y}{k}$  , then  $k = \dots\dots\dots$

(a) 8

(b) 9

(c) 13

(d) 14

7 The relation which represents direct variation between  $y$  and  $X$  is .....  
(a)  $XY = 5$  (b)  $y = X^2 + 3$  (c)  $\frac{X}{3} = \frac{4}{y}$  (d)  $\frac{X}{5} = \frac{y}{3}$

8 If  $(1 , 2) \in \{(1 , X) , (3 , 4)\}$  , then  $X = \dots\dots\dots$

(a) 1

(b) 2

(c) 3

(d) 4

9  $f(X) = 5$  is represented by a straight line that is parallel to  $X$ -axis and passes through the point .....  
(a) (0 , 5) (b) (5 , 0) (c) (5 , -5) (d) (0 , 0)

10 If  $y \propto X$  and  $X = 1$  when  $y = 4$  , then the variation constant = .....  
(a) 4 (b) 3 (c) 2 (d) 1

## Algebra and Statistics

11 If  $\frac{a}{b} = \frac{2}{3}$ , then  $3a - 2b = \dots\dots\dots$

- (a) 3                                      (b) 2                                      (c) 1                                      (d) zero
- 

12 If  $Xy = 5$ , then  $y$  varies inversely as  $\dots\dots\dots$

- (a)  $X$                                       (b)  $\frac{1}{X}$                                       (c)  $\frac{5}{X}$                                       (d)  $5 + X$
- 

13 If  $\frac{a}{b} = \frac{b}{c} = 2$ , then  $\frac{a}{c} = \dots\dots\dots$

- (a) 2                                      (b) 4                                      (c) 6                                      (d) 8
- 

14 The S.S. of the equation :  $X^2 + 9 = 0$  where  $X \in \mathbb{R}$  is  $\dots\dots\dots$

- (a)  $\{-3\}$                                       (b)  $\{3\}$                                       (c)  $\{-3, 3\}$                                       (d)  $\emptyset$
- 

15 If  $X \times Y = \{(1, 2), (3, 2)\}$ , then  $Y = \dots\dots\dots$

- (a)  $\{1, 2\}$                                       (b)  $\{3, 2\}$                                       (c)  $\{2\}$                                       (d)  $\{1, 3\}$
- 

16 If  $f(X) = X + b$ ,  $f(3) = 7$ , then  $b = \dots\dots\dots$

- (a) 10                                      (b) 7                                      (c) 4                                      (d) 3
- 

17 If  $y \propto X$ ,  $y \propto \frac{1}{z}$ , then  $y \propto \dots\dots\dots$

- (a)  $\frac{X}{z}$                                       (b)  $\frac{z}{X}$                                       (c)  $Xz$                                       (d)  $X + z$
- 

18 The point  $(-2, -3)$  lies in the  $\dots\dots\dots$  quadrant.

- (a) first                                      (b) second                                      (c) third                                      (d) fourth
- 

19 If  $n(X) = 3$ ,  $n(X \times Y) = 6$ , then  $n(Y) = \dots\dots\dots$

- (a) 2                                      (b) 3                                      (c) 6                                      (d) 9
- 

20 If  $\frac{a}{b} = \frac{c}{d} = \frac{3}{5}$ , then  $\frac{a+c}{b+d} = \dots\dots\dots$

- (a)  $\frac{5}{3}$                                       (b)  $\frac{3}{5}$                                       (c)  $\frac{6}{5}$                                       (d)  $\frac{5}{6}$
- 

21 If  $a, b, 2, 3$  are proportional quantities, then  $\frac{b}{a} = \dots\dots\dots$

- (a)  $\frac{3}{2}$                                       (b)  $\frac{2}{3}$                                       (c)  $\frac{1}{3}$                                       (d)  $\frac{1}{2}$
-

## Second Essay questions

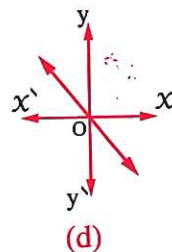
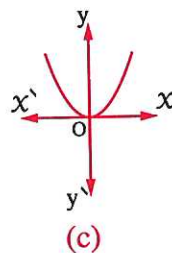
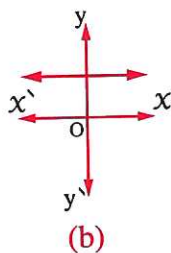
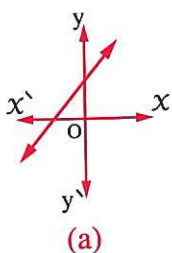
- 22 Draw the curve of the function  $f : f(x) = x^2 - 1$  where  $x \in [-2, 2]$   
 and from the graph, find : **1** The minimum value of the function.  
**2** The equation of the symmetry axis of the curve.
- 
- 23 If  $y \propto \frac{1}{x}$  and  $y = 3$  when  $x = 4$ , find the value of  $y$  when  $x = 6$
- 
- 24 Calculate the standard deviation of the values : 1, 3, 5, 7, 9

## Exam 2 Port Said 2024

### First Multiple choice questions

Choose the correct answer from those given :

- 1 If  $x - y = 3$ ,  $x + y = 7$ , then  $x^2 - y^2 = \dots\dots\dots$   
 (a) 4 (b) 10 (c) 14 (d) 21
- 
- 2 If  $X, Y$  are two non empty sets and  $n(X) = n(X \times Y)$ , then  $n(Y) = \dots\dots\dots$   
 (a) 3 (b) 2 (c) 1 (d) zero
- 
- 3 If  $3a = 5b$ , then  $a : b = \dots\dots\dots$   
 (a) 3 : 5 (b) 5 : 3 (c) 8 : 5 (d) 5 : 8
- 
- 4 If  $\frac{a}{b} = \frac{b}{c} = \frac{c}{3} = 2$ , then  $a = \dots\dots\dots$   
 (a) 3 (b) 6 (c) 12 (d) 24
- 
- 5 If  $\{2\} \times \{x, y\} = \{(2, 4), (2, 3)\}$ , then  $x - y = \dots\dots\dots$   
 (a) 1 (b) -1 (c)  $\pm 1$  (d) zero
- 
- 6 The line that represents the function  $f : f(x) = x + 1$  cuts  $y$ -axis at the point  $\dots\dots\dots$   
 (a) (1, 0) (b) (0, 1) (c) (-1, 0) (d) (0, -1)
- 
- 7 Which of the following graphs represents a direct variation between  $x$  and  $y$  ?





## Algebra and Statistics

- 8 The sum of the two square roots of the number  $2\frac{1}{4}$  is .....  
(a)  $1\frac{1}{2}$  (b)  $\frac{1}{2}$  (c) zero (d) 1
- 
- 9  $f : f(x) = 3$  is a polynomial function of the ..... degree.  
(a) third (b) second (c) first (d) zero
- 
- 10 The middle proportional between the two numbers 3, 27 is .....  
(a) 9 (b) -9 (c)  $\pm 9$  (d) 81
- 
- 11 If  $x - 2y = 0$ , then  $x \propto$  .....  
(a) y (b)  $\frac{1}{y}$  (c)  $\frac{2}{y}$  (d)  $\frac{y}{2}$
- 
- 12 The third proportional for the numbers 3, 5, ..., 15 is .....  
(a) 10 (b) 9 (c) 8 (d) 6
- 
- 13 If  $X = \{3, 5, 7\}$  and R is a relation on X, then the relation which represents a function is .....  
(a)  $R = \{(3, 5), (5, 3), (3, 7)\}$  (b)  $R = \{(3, 5), (5, 5), (7, 5)\}$   
(c)  $R = \{(3, 5), (5, 7)\}$  (d)  $R = \{(3, 3), (3, 5), (3, 7)\}$
- 
- 14 The dispersion for the values : 3, 3, 3, 3 is .....  
(a) zero (b) 1 (c) 3 (d) 6
- 
- 15 If  $b < 2$ , then the point  $(b - 2, 4)$  lies in the ..... quadrant.  
(a) first (b) second (c) third (d) fourth
- 
- 16 If  $\frac{a}{b} = \frac{7}{5}$ , then  $\frac{a+b}{a-b} =$  .....  
(a) 3 (b) 4 (c) 5 (d) 6
- 
- 17 If  $y \propto \frac{1}{x}$  and  $x = 1$  when  $y = 4$ , then the relation between y and x is .....  
(a)  $xy = 1$  (b)  $\frac{x}{y} = 4$  (c)  $\frac{y}{x} = 4$  (d)  $xy = 4$
- 
- 18 If  $f(x) = x^3$ , then  $f(2) + f(-2) =$  .....  
(a) 8 (b) 4 (c) -8 (d) zero

19 If  $\frac{a}{b} = \frac{c}{d} = 5$ , then  $\frac{2a-3c}{2b-3d} = \dots\dots\dots$

- (a) 10 (b) 15 (c) 5 (d) 1

20 If  $(3, b) \in f(x) = 2x - 1$ , then  $b = \dots\dots\dots$

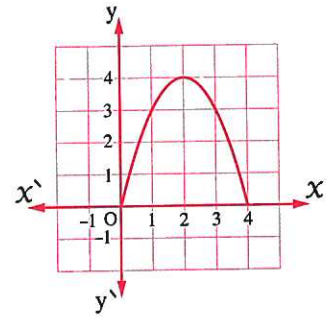
- (a) 4 (b) 5 (c) 6 (d) 7

21 If  $y^2 x^2 - 4yx + 4 = 0$ , then  $y \propto \dots\dots\dots$

- (a)  $x$  (b)  $x^2$  (c)  $\frac{1}{x}$  (d)  $\frac{1}{x^2}$

## Second Essay questions

22 The opposite figure is the graphical representation of  $f(x) = 4x - x^2$  where  $x \in [0, 4]$ , find from the graph :



- 1 The point of the vertex of the curve.
- 2 The equation of the symmetry axis.
- 3 The minimum or maximum value of the function.

23 If  $a, b, c, d$  are proportional quantities, show that :  $\frac{a+2c}{b+2d} = \frac{c-a}{d-b}$

24 Calculate the arithmetic mean and the standard deviation for the following values :  
8, 9, 7, 6, 5

## Exam 3

### First Multiple choice questions

Choose the correct answer from those given :

1 The simplest and easiest method of measuring dispersion is the .....

- (a) mean. (b) median.  
(c) range. (d) standard deviation.

2 If  $X = \{3\}$ ,  $n(Y) = 5$ , then  $n(X \times Y) = \dots\dots\dots$

- (a) 1 (b) 5 (c) 8 (d) 15

3 The relation which represents an inverse variation between  $x$  and  $y$  is .....

- (a)  $xy = 5$  (b)  $y = x + 3$  (c)  $\frac{x}{5} = \frac{y}{3}$  (d)  $y = 2x$

## Algebra and Statistics

- 4  $-2x^2 \times 3x = \dots\dots\dots$   
(a)  $6x^3$  (b)  $6x^2$  (c)  $-6x^3$  (d)  $-5x^3$
- 
- 5 If  $f(x) = 3$ , then  $f(1) + f(-1) = \dots\dots\dots$   
(a) 0 (b) 6 (c) 1 (d) 3
- 
- 6 If  $(x+5, 8) = (1, y+x)$ , then  $y = \dots\dots\dots$   
(a) 12 (b) 8 (c)  $-8$  (d)  $-12$
- 
- 7 The middle proportional between 2 and 8 is  $\dots\dots\dots$   
(a) 16 (b)  $\pm 16$  (c) 4 (d)  $\pm 4$
- 
- 8 If  $\frac{a}{3} = \frac{b}{5}$ , then  $\frac{2a+2b}{3b-a} = \dots\dots\dots$   
(a)  $\frac{3}{4}$  (b)  $\frac{4}{3}$  (c)  $\frac{8}{5}$  (d)  $\frac{5}{8}$
- 
- 9 If  $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = k$  where  $k \in \mathbb{R}$ , then  $\frac{ace}{bdf} = \dots\dots\dots$   
(a)  $k^3$  (b)  $k^2$  (c)  $k$  (d) 3
- 
- 10 The function  $f : f(x) = x - 2$  is represented by a straight line cutting the y-axis at the point  $\dots\dots\dots$   
(a) (2, 0) (b) (0, 2) (c)  $(-2, 0)$  (d)  $(0, -2)$
- 
- 11 The third proportional of 4, 12, ..., 48 is  $\dots\dots\dots$   
(a) 7 (b) 32 (c) 16 (d) 36
- 
- 12 Twice the number  $2^5$  is  $\dots\dots\dots$   
(a)  $4^5$  (b)  $2^{10}$  (c)  $2^6$  (d)  $4^{10}$
- 
- 13 If  $y \propto x$  and  $y = 20$  when  $x = 4$ , then  $y = \dots\dots\dots$  when  $x = 6$   
(a) 30 (b) 15 (c) 60 (d) 24
- 
- 14 If  $(3, 5) \in \{1, 3\} \times \{x, 7\}$ , then  $x = \dots\dots\dots$   
(a) 7 (b) 5 (c) 1 (d) 3
- 
- 15 If  $X = \{1, 2, 5\}$ ,  $R$  represents a function on  $X$  where  $R = \{(1, 2), (a, 5), (b, 5)\}$ , then  $a + b = \dots\dots\dots$   
(a) 10 (b) 4 (c) 8 (d) 7



16 If  $f(x) = x^2 - 1$ ,  $g(x) = x + 1$ , then  $f(-1) + g(-1) = \dots\dots\dots$

- (a) 0                      (b) -2                      (c) 2                      (d) 4

17 If  $3a = 4b$ , then  $a : b = \dots\dots\dots$

- (a) 3 : 4                      (b) 4 : 3                      (c) 3 : 7                      (d) 4 : 7

18 If  $y \propto \frac{1}{x^2}$ ,  $y = 6$  when  $x = 2$ , then the variation constant equals  $\dots\dots\dots$

- (a) 3                      (b) 1.5                      (c) 12                      (d) 24

19 If  $\frac{a}{4} = \frac{4}{8}$ , then  $a = \dots\dots\dots$

- (a) 2                      (b) 16                      (c) 8                      (d) 4

20 The function  $f : f(x) = 2(x^2 - 1)$  is of the  $\dots\dots\dots$  degree.

- (a) first                      (b) second                      (c) third                      (d) fourth

21 If  $4x^2 - 4xy + y^2 = 0$ , then  $y \propto \dots\dots\dots$

- (a)  $\frac{1}{x}$                       (b)  $\frac{1}{x^2}$                       (c)  $x$                       (d)  $x^2$

## Second Essay questions

22 Represent graphically the function  $f : f(x) = x^2 + 2x + 1$  where  $x \in [-4, 2]$  and from the graph deduce the coordinates of the vertex of the curve and the minimum or the maximum value of the function.

23 If  $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$ , find the value of :  $\frac{2y - z}{3x - 2y + z}$

24 Calculate the mean and the standard deviation for the values : 3, 6, 7, 9, 15

## Exam 4

### First Multiple choice questions

Choose the correct answer from those given :

1 The point  $(-3, 4)$  lies in the  $\dots\dots\dots$  quadrant.

- (a) first                      (b) second                      (c) third                      (d) fourth

2 The range of the values : 7, 3, 6, 9, 5 is  $\dots\dots\dots$

- (a) 3                      (b) 4                      (c) 5                      (d) 6

## Algebra and Statistics

- 3 If  $y \propto x$  and  $y = 2$  when  $x = 8$ , then  $y = 3$  when  $x = \dots\dots\dots$   
(a) 16 (b) 12 (c) 24 (d) 6
- 
- 4 If  $f(x) = kx + 8$ ,  $f(2) = 0$ , then  $k = \dots\dots\dots$   
(a) 8 (b) -6 (c) 4 (d) -4
- 
- 5 If  $x, 3, 4, 6$  are proportional quantities, then  $x = \dots\dots\dots$   
(a) 0 (b) 1 (c) 2 (d) 3
- 
- 6 If  $x^2 = 25$  where  $x \in \mathbb{Z}$ , then  $x = \dots\dots\dots$   
(a) 5 (b) -5 (c)  $\pm 5$  (d) -25
- 
- 7 If  $n(X) = 2$ ,  $n(X \times Y) = 6$ , then  $n(Y^2) = \dots\dots\dots$   
(a) 4 (b) 9 (c) 16 (d) 12
- 
- 8 If 3, 6,  $x$  are in continued proportion, then  $x = \dots\dots\dots$   
(a) 12 (b) 18 (c) 24 (d) 36
- 
- 9 If  $(-1, 2) \in$  the function  $f : f(x) = 2x + c$ , then  $c = \dots\dots\dots$   
(a) 2 (b) -2 (c) 4 (d) -4
- 
- 10 If  $\frac{a}{3} = \frac{b}{5}$ , then  $\frac{b}{a} = \dots\dots\dots$   
(a)  $\frac{3}{5}$  (b)  $\frac{5}{3}$  (c)  $\frac{5}{8}$  (d)  $\frac{3}{8}$
- 
- 11  $\sqrt{(10)^2 - (6)^2} = 10 - \dots\dots\dots$   
(a) 6 (b) 8 (c) 2 (d) 4
- 
- 12 If  $2x = 5y$ , then  $y \propto \dots\dots\dots$   
(a)  $x$  (b)  $\frac{1}{x}$  (c)  $x^2$  (d)  $\frac{1}{x^2}$
- 
- 13 If  $\frac{a}{2} = \frac{b}{5} = \frac{c}{7} = \frac{a+b+c}{2x}$ , then  $x = \dots\dots\dots$   
(a) 14 (b) 7 (c) 28 (d) 21
- 
- 14 If  $X = \{2\}$ , then  $X^2 = \dots\dots\dots$   
(a)  $\{4\}$  (b)  $(2, 2)$  (c)  $\{(4, 4)\}$  (d)  $\{(2, 2)\}$

15 If the relation  $R = \{(1, 2), (2, 3), (3, 4)\}$ , then  $R$  represents a function where its range is .....

- (a)  $\{1, 2, 3\}$       (b)  $\{2, 3, 4\}$       (c)  $\{1, 2, 3, 4\}$       (d)  $\{1, 4\}$

16 All the following functions are polynomial except  $f : f(x) = \dots\dots\dots$

- (a)  $\frac{3}{4}x + 1$       (b)  $\sqrt{2}x - 2$       (c)  $x\left(\frac{1}{x} + 3\right)$       (d)  $x(x - 5)$

17 If  $y$  varies inversely as  $x$ , then .....

- (a)  $y = x$       (b)  $y = mx$       (c)  $x = my$       (d)  $y = \frac{m}{x}$

18 If  $b$  is the middle proportional between  $a$  and  $c$ , then .....

- (a)  $b = \pm ac$       (b)  $b^2 = a^2 c^2$       (c)  $b^2 = 2ac$       (d)  $b = \pm \sqrt{ac}$

19 If  $a, 4, b, 8$  are proportional quantities, then  $\frac{a}{b} = \dots\dots\dots$

- (a)  $\frac{1}{2}$       (b) 2      (c) 16      (d) 32

20 The function  $f : f(x) = 5$  is represented by a straight line passing through the point .....

- (a)  $(5, -5)$       (b)  $(5, 0)$       (c)  $(0, 5)$       (d)  $(0, -5)$

21 If  $x^2 y^2 + 16 = 8xy$ , then  $y \propto \dots\dots\dots$

- (a)  $x^2$       (b)  $x$       (c)  $4x$       (d)  $\frac{1}{x}$

## Second Essay questions

22 If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

23 Represent graphically the function  $f : f(x) = x^2 - 2, x \in [-3, 3]$  and deduce :

- 1 The coordinates of the vertex of the curve.
- 2 The equation of the axis of symmetry.

24 Calculate the mean and the standard deviation for the values : 72, 53, 61, 70, 59

## Exam 5

## First Multiple choice questions

Choose the correct answer from those given :

1 If 2, 5,  $x$ , 15 are proportional, then  $x = \dots\dots\dots$

- (a) 4      (b) 10      (c) 6      (d) 30



## Algebra and Statistics

**2** The positive square root of the average of squares of deviations of the values from their mean is called the .....

- (a) range. (b) mean.  
(c) standard deviation. (d) mode.

**3** The multiplicative inverse of 2 is .....

- (a) 2 (b)  $\frac{1}{2}$  (c)  $-\frac{1}{2}$  (d) -2

**4** If  $X = \{2, 1\}$ ,  $Y = \{0, 2\}$ , then  $n(X \times Y) = \dots\dots\dots$

- (a) 0 (b) 2 (c) 4 (d) 5

**5** If  $f(X) = X + 1$ , then which of the following points belongs to the function  $f$ ?

- (a) (2, 1) (b) (-1, 1) (c) (-2, 1) (d) (1, 2)

**6** If  $y \propto X$ ,  $y = 15$  when  $X = 3$ , then  $y = \dots\dots\dots$  when  $X = 5$

- (a) 25 (b) 45 (c) 20 (d) 30

**7** If  $3a = 4b$ , then  $b : a = \dots\dots\dots$

- (a) 3 : 7 (b) 4 : 3 (c) 3 : 4 (d) 4 : 7

**8** The third proportional of 5, 25 is .....

- (a) 5 (b) 125 (c)  $\pm 125$  (d)  $\pm 25$

**9** If  $\frac{a}{3} = \frac{b}{4} = \frac{c}{5} = \frac{3a-b+c}{2X}$ , then  $X = \dots\dots\dots$

- (a) 5 (b) 12 (c) 4 (d) 8

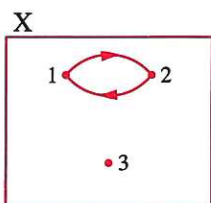
**10** If  $X^2 = 4$ , then  $|X| = \dots\dots\dots$

- (a)  $\pm 2$  (b) 2 (c) -2 (d)  $\pm 4$

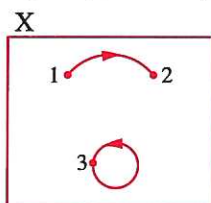
**11** If  $Y \times X = \{(1, 2), (1, 3)\}$ , then  $X = \dots\dots\dots$

- (a) {1} (b) {1, 2, 3} (c) (2, 3) (d) {2, 3}

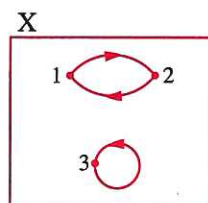
**12** Which of the following diagrams represents a function on  $X$ ?



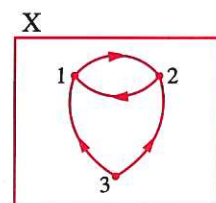
(a)



(b)



(c)



(d)

13 The function  $f : f(x) = 2x^2 + 3(x + 1)$  is a polynomial of the ..... degree.

- (a) first                      (b) second                      (c) third                      (d) fourth

14 If  $x^2 + 9y^2 = 6xy$ , then  $y \propto$  .....

- (a)  $x^2$                       (b)  $\frac{1}{x^2}$                       (c)  $\frac{1}{x}$                       (d)  $x$

15 If  $(2 + a, 1) = (3, 3 - b)$ , then  $a + b =$  .....

- (a) 5                      (b) 3                      (c) 4                      (d) 2

16 If  $f(x) = x - 3$ , then  $f(3) + f(2) =$  .....

- (a) -1                      (b) 5                      (c) -3                      (d) 3

17 If  $xy = 5$ , then  $y \propto$  .....

- (a)  $\frac{1}{x}$                       (b)  $x - 5$                       (c)  $x$                       (d)  $x + 5$

18 If  $\frac{a}{b} = \frac{b}{3} = 5$ , then  $a =$  .....

- (a) 15                      (b) 45                      (c) 75                      (d) 125

19 If  $f(x) = x^2 - 4$ , then the minimum value of the function  $f$  is .....

- (a) -5                      (b) -4                      (c) -3                      (d) zero

20 If  $\frac{x}{y} = \frac{3}{4}$ , then  $4x - 3y =$  .....

- (a) 1                      (b) -1                      (c) 4                      (d) zero

21 If  $y \propto \frac{1}{x^2}$ ,  $y = 2$  when  $x = 2$ , then  $x$  could be ..... when  $y = \frac{1}{2}$

- (a)  $\frac{1}{2}$                       (b) 4                      (c) 8                      (d) 16

## Second Essay questions

22 If  $a, b, c, d$  are proportional quantities, prove that :  $\frac{a-b}{a} = \frac{c-d}{c}$

23 Calculate the standard deviation of : 8, 9, 6, 7, 5

24 Represent graphically the function  $f : f(x) = (x - 2)^2$  where  $x \in [0, 4]$ , then deduce :

- 1 The vertex of the curve.
- 2 The equation of the axis of symmetry.
- 3 The minimum or maximum value.



1

Cairo Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1 The sum of measures of the interior angles of the parallelogram equals .....  
 (a)  $90^\circ$  (b)  $180^\circ$  (c)  $270^\circ$  (d)  $360^\circ$
- 2 The length of the perpendicular distance between the two straight lines  $X + 2 = 0$  and  $X = 3$  equals ..... length units.  
 (a) 1 (b) 2 (c) 3 (d) 5
- 3 The number of axes of symmetry of the rectangle is .....  
 (a) zero (b) 2 (c) 4 (d) an infinite number.
- 4 The length of the side opposite to the angle of measure  $30^\circ$  in the right-angled triangle equals ..... the length of the hypotenuse.  
 (a) quarter (b) third (c) half (d) twice
- 5 If  $\sin X = \cos X$  where  $X$  is an acute angle , then  $m(\angle X) =$  .....  
 (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- 6 The slope of the straight line whose equation is  $aX + by + c = 0$  equals .....  
 (where  $b \neq 0$ )  
 (a)  $-\frac{a}{b}$  (b)  $\frac{a}{b}$  (c)  $-\frac{b}{a}$  (d)  $\frac{b}{a}$

2 [a] Without using calculator , find the value of  $X$  which satisfies :

$$2X \tan 45^\circ = \tan 60^\circ \cos 30^\circ \quad (\text{Show steps of solution})$$

- [b] Find the equation of the straight line which passes through the point (1 , 5) and its slope equals 3

3 [a] Without using calculator , prove that :

$$\cos^2 60^\circ = \tan 45^\circ - \sin^2 60^\circ \quad (\text{Show steps of solution})$$

- [b] ABCD is a parallelogram where A (3 , 4) , B (2 , - 1) and C (- 5 , 2) , M is the point of intersection of its diagonals.

Find : 1 The coordinates of the point M

2 The coordinates of the point D



- 4 [a] ABC is a right-angled triangle at B where  $AB = 5$  cm. ,  $AC = 13$  cm.

**Prove that :**  $\sin^2 C + \cos^2 C = 1$

- [b] Prove that the straight line passing through the two points  $(3, 2)$  ,  $(1, 3)$  is perpendicular to the straight line  $y = 2x + 5$

- 5 [a] Find the diameter length of the circle whose centre is  $M(2, 7)$  and passes through the point  $A(-1, 3)$

- [b] A straight line its slope equals 3 and intercepted 6 units from the positive part of the y-axis.

**Find :** 1 The equation of this straight line.

2 Its point of intersection with the X-axis.

2

Giza Governorate



*Answer the following questions :*

- 1 Choose the correct answer :

- 1 If  $\sin 30^\circ = \cos X$  , where  $X$  is the measure of an acute angle , then the value of  $X = \dots\dots\dots$

(a)  $15^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $60^\circ$

- 2 The straight line whose equation is  $y = 2x - 8$  intercepts from the positive part of the X-axis a part of length  $\dots\dots\dots$  length units.

(a) 1 (b) 3 (c) 4 (d) 7

- 3 The distance between the point  $(3, -4)$  and the X-axis equals  $\dots\dots\dots$  length units.

(a) 3 (b) 4 (c) 7 (d) 12

- 4 If  $\Delta ABC$  is an isosceles triangle in which  $AB = 3$  cm. ,  $BC = 7$  cm. , then  $AC = \dots\dots\dots$  cm.

(a) 3 (b) 4 (c) 7 (d) 10

- 5 If the area of a square is  $100 \text{ cm}^2$  , then its perimeter is  $\dots\dots\dots$  cm.

(a) 40 (b) 50 (c) 60 (d) 100

- 6 The slope of the straight line which is parallel to the X-axis is  $\dots\dots\dots$

(a) undefined (b) zero (c) 1 (d)  $-1$

- 2 [a] If  $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$  , then without using calculator find the value of  $X$  where  $X$  is the measure of an acute angle.

- [b] Find the equation of the straight line which passes through the point  $(2, -5)$  and it is parallel to the straight line whose equation is  $2x + y - 7 = 0$

- 3 [a]** If ABC is a right-angled triangle at B , where  $AC = 5$  cm. ,  $BC = 4$  cm. , then find the value of :  $\sin A \cos C + \cos A \sin C$
- [b]** If the point C (3 , 4) is the midpoint of  $\overline{AB}$  , where A (1 , 2) , then find the coordinates of the point B
- 
- 4 [a]** Find the slope of the straight line and the length of the intercepted part of y-axis where its equation is  $2x - 3y + 6 = 0$
- [b]** If the distance between the two points (x , 5) and (6 , 1) is  $2\sqrt{5}$  length units , then find the value of x
- 
- 5 [a]** State the type of the triangle ABC , where its vertices are A (-2 , 4) , B (3 , -1) , C (4 , 5) with respect to its sides.

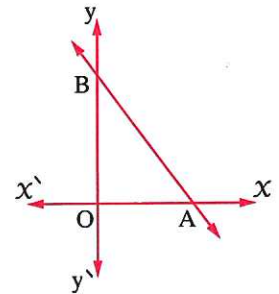
**[b] In the opposite figure :**

If  $OA = 3$  length units ,  $OB = 4$  length units

where O is the origin point , then find :

**1** The coordinates of the midpoint of  $\overline{AB}$

**2** The equation of  $\overleftrightarrow{AB}$



**3**

Alexandria Governorate



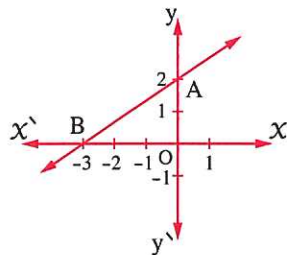
**Answer the following questions : (Calculators are permitted)**

- 1 Choose the correct answer from those given :**
- 1** The length of the radius of the circle whose center is (-2 , 3) and passes through the point (2 , -1) equals ..... length units.  
 (a) 5 (b)  $4\sqrt{2}$  (c) 2 (d) 3
- 2** The quadrilateral whose diagonals are equal in length and perpendicular is the .....  
 (a) rhombus. (b) rectangle. (c) square. (d) parallelogram.
- 3** ABCD is a parallelogram ,  $m(\angle A) + m(\angle C) = 200^\circ$  , then  $m(\angle B) =$  .....  
 (a)  $80^\circ$  (b)  $50^\circ$  (c)  $100^\circ$  (d)  $110^\circ$
- 4** The volume of the cuboid whose dimensions are  $\sqrt{2}$  cm. ,  $\sqrt{3}$  cm. ,  $\sqrt{6}$  cm. equals .....  $\text{cm}^3$ .  
 (a)  $2\sqrt{6}$  (b)  $3\sqrt{6}$  (c)  $3\sqrt{2}$  (d) 6
- 5** If the triangle ABC is a right-angled triangle at A , then  $\sin B : \cos C =$  .....  
 (a)  $\frac{3}{5}$  (b)  $\frac{3}{4}$  (c) 1 (d)  $\frac{4}{3}$

**6 In the opposite figure :**

The slope of  $\overrightarrow{AB}$  = .....

- (a)  $-\frac{3}{2}$  (b)  $-\frac{2}{3}$   
(c)  $\frac{3}{2}$  (d)  $\frac{2}{3}$



**2 [a] Without using the calculator , prove that :  $\sin^3 30^\circ = 9 \cos^3 60^\circ - \tan^2 45^\circ$**

**[b]** Prove that the points A ( - 3 , 0 ) , B ( 3 , 4 ) , C ( 1 , - 6 ) are the vertices of an isosceles triangle and find its surface area.

**3 [a] Find the value of  $X$  , where  $X$  is the measure of an acute angle , if :**

$$3 \sin X^\circ \cos^2 45^\circ = \sin^2 60^\circ$$

**[b]** Find the slope of the straight line  $\frac{x}{2} + \frac{y}{3} = 1$  , then find the length of y intercept.

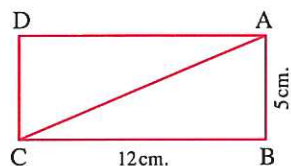
**4 [a]** If  $\overleftrightarrow{CD}$  is parallel to the  $X$ -axis , where C ( 4 , 2 ) , D ( - 5 , y ) , find the value of y

**[b] In the opposite figure :**

ABCD is a rectangle , AB = 5 cm. , BC = 12 cm.

**Find :** **1** The length of  $\overline{AC}$

**2** The value of :  $5 \tan (\angle ACD) - 13 \sin (\angle DAC)$



**5 [a]** If the straight line whose equation is :  $y - a x + 3 = 0$  is perpendicular to the straight line which passes through the points ( 5 , 2 ) , ( 6 , - 3 ) , find the value of a

**[b]** ABC is a triangle , where A ( 1 , 2 ) , B ( - 2 , 3 ) , C ( - 4 , - 3 ) ,  $\overline{AD}$  is a median of the triangle ABC , find the equation of the straight line which passes through the points A , D

**4**

**El-Kalyoubia Governorate**



**Answer the following questions :**

**1 Choose the correct answer from the given ones :**

**1** If ABCD is a parallelogram , then  $AD + BC = \dots\dots\dots$

- (a) 2 AC (b) 2 BD (c) 2 AB (d) 2 BC



2 The length of the radius of the circle whose center is (7, 4) and passes through the point (3, 1) equals ..... length units.

- (a) 8 (b) 6 (c) 5 (d) 4

3 If 4, 9, L are the side lengths of a triangle, then L may equal .....

- (a) 3 (b) 4 (c) 5 (d) 6

4 If the slopes of two parallel straight lines are  $-\frac{3}{2}$ ,  $\frac{6}{k}$ , then k = .....

- (a) -4 (b)  $\frac{3}{2}$  (c) 2 (d) 9

5 If ABC is a right-angled triangle at B,  $m(\angle C) = 30^\circ$ , AB = 6 cm, then AC = ..... cm.

- (a) 3 (b) 6 (c) 10 (d) 12

6 If  $\tan \frac{a}{b} = 1$ , then  $\tan \frac{2a}{3b} = \dots\dots\dots$

- (a)  $\frac{1}{2}$  (b)  $\frac{1}{\sqrt{3}}$  (c)  $\frac{2}{3}$  (d)  $\sqrt{3}$

2 [a] If C (3, 1) is the midpoint of  $\overline{AB}$ , where A (1, y), B (x, 3), find : (x, y)

[b] Find the value of x which satisfies :  $x \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

3 [a] If ABCD is a quadrilateral where A (2, 4), B (-3, 0), C (-7, 5) and D (-2, 9), prove that the figure ABCD is a square.

[b] If ABC is a right-angled triangle at C, AB = 13 cm., BC = 12 cm.

, find : 1 The length of  $\overline{AC}$  2  $1 + \tan^2 A$

4 [a] If (0, 1), (a, 3), (2, 5) are collinear, find the value of a

[b] Prove that the straight line which passes through the two points  $(4, 3\sqrt{3})$  and  $(5, 2\sqrt{3})$  is perpendicular to the straight line which makes with the positive direction of the x-axis an angle of measure  $30^\circ$

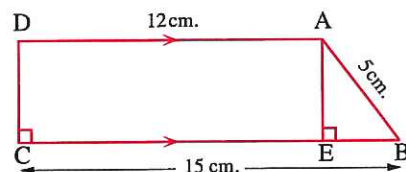
5 [a] Find the equation of the straight line whose slope is 3 and passes through the point (1, 0)

[b] In the opposite figure :

ABCD is a trapezium right-angled at C  
 $\overline{AD} \parallel \overline{BC}$ ,  $\overline{AE} \perp \overline{BC}$ , AD = 12 cm.  
 , AB = 5 cm., BC = 15 cm.

Find : 1 The length of  $\overline{AE}$

2 The value of :  $\tan(\angle BAE) \times \tan(\angle ACB)$





Answer the following questions : (Calculator is allowed)

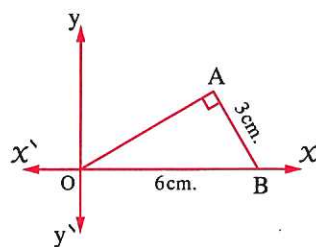
**1 Choose the correct answer from those given :**

- [1] If the straight line which passes through the two points  $(2, 4)$ ,  $(3, k)$  makes an angle of measure  $45^\circ$  with the positive direction of  $X$ -axis, then  $k = \dots\dots\dots$
- (a) 3 (b) 1 (c) 5 (d) 6
- [2] If  $\sin(X + 20)^\circ = \frac{1}{2}$  where  $(X + 20)^\circ$  is the measure of an acute angle, then  $\tan(55 - X)^\circ = \dots\dots\dots$
- (a)  $\frac{\sqrt{3}}{2}$  (b) 1 (c)  $\frac{1}{2}$  (d)  $\frac{\sqrt{2}}{2}$
- [3] The point  $(4, 6)$  is the image of the point  $(-2, 2)$  by reflection in the point  $\dots\dots\dots$
- (a) origin point. (b)  $(-1, -4)$  (c)  $(1, 4)$  (d)  $(4, 1)$
- [4] If  $\overline{AB}$  is a diameter of a circle where  $A(-1, 4)$ ,  $B(-3, -2)$ , then the area of the circle equals  $\dots\dots\dots \pi$  square units.
- (a) 10 (b)  $2\sqrt{10}$  (c) 20 (d) 80
- [5] If the ratio between the measures of two supplementary angles is  $4 : 5$ , then the measure of the greater angle equals  $\dots\dots\dots$
- (a)  $40^\circ$  (b)  $50^\circ$  (c)  $80^\circ$  (d)  $100^\circ$

**6 In the opposite figure :**

The equation of  $\overleftrightarrow{OA}$  is  $y = \dots\dots\dots$

- (a)  $\sqrt{3}x$  (b)  $\frac{1}{2}x$
- (c)  $\frac{1}{\sqrt{3}}x$  (d)  $\frac{1}{3}x$



- 2 [a]** Find the equation of the straight line which passes through the point  $(-6, -1)$  and is parallel to the straight line whose equation is  $\frac{1}{2}x + 3y = 1$

**[b] Find the value of  $X$  if :**

$\cos X \tan X + \sin 30^\circ = 1$  where  $X$  is the measure of an acute angle.

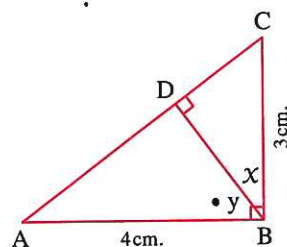
- 3 [a] ABCD is a rectangle in which A (1 , 1) , B (3 , 3) , C (0 , - 3 X) , D (X , y)  
find the value of each of X , y

[b] In the opposite figure :

$\Delta ABC$  is right-angled at B where  $\overline{BD} \perp \overline{AC}$

, AB = 4 cm. , BC = 3 cm.

Find the value of :  $\tan X \tan y + \sin A$



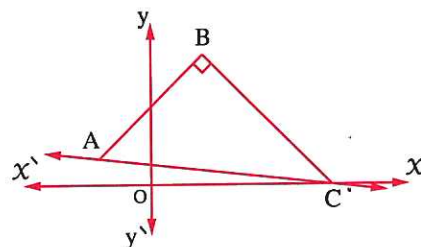
- 4 [a] Find the equation of the straight line which passes through the point (5 , - 2) and is perpendicular to the straight line which passes through the two points (3 , 2) , (- 1 , 0)
- [b] Prove that the points A (1 , 4) , B (- 1 , - 2) , C (2 , - 3) are the vertices of a right-angled triangle at B , then find its area.

- 5 [a] Without using the calculator , prove that :  $\cos 60^\circ = 2 \cos^2 30^\circ - \tan 45^\circ$

[b] In the opposite figure :

A (- 2 , 1) , B (2 , 5)

Find the equation of  $\overleftrightarrow{AC}$



6

El-Monofia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 The triangle whose side lengths are 5 cm. , 5 cm. , ..... cm. is an isosceles triangle.  
(a) 12 (b) 11 (c) 10 (d) 9
- 2 The number of the axes of symmetry of an equilateral triangle equals .....  
(a) zero (b) 1 (c) 2 (d) 3
- 3 If XYZ is a triangle ,  $(XY)^2 > (YZ)^2 + (XZ)^2$  , then  $\angle Z$  is .....  
(a) acute. (b) right. (c) obtuse. (d) straight.
- 4 If  $\cos 2X = \frac{1}{2}$  , where X is the measure of an acute angle , then X = .....  
(a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- 5 If  $\frac{2}{3}$  ,  $\frac{k}{2}$  are the slopes of two parallel straight lines , then k = .....  
(a)  $-\frac{4}{3}$  (b)  $-\frac{3}{4}$  (c)  $\frac{4}{3}$  (d) 3



## Trigonometry and Geometry

- 6 If  $\overline{AB}$  is a diameter in a circle of center M , where A (3 , - 5) , B (5 , 1) , then the center of the circle M = .....
- (a) (2 , 2)                      (b) (4 , - 2)                      (c) (4 , 2)                      (d) (8 , - 2)

- 2 [a] Without using a calculator , find the value of :

$$\sin 45^\circ \cos 45^\circ + \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ$$

- [b] Prove that  $\Delta ABC$  whose vertices are A (1 , - 2) , B (- 4 , 2) , C (1 , 6) is isosceles.

- 3 [a] If  $\Delta ABC$  is a right-angled triangle at C , AB = 10 cm. , BC = 8 cm. , find the value of :  $\sin A \cos B + \cos A \sin B$

- [b] Find the equation of the straight line which passes through the point (3 , 4) and is perpendicular to the straight line  $3x - 2y + 7 = 0$

- 4 [a] If  $2 \sin E = \tan^2 60^\circ - 2 \tan 45^\circ$  , where E is the measure of an acute angle , find the value of E

- [b] Prove that the triangle whose vertices are A (1 , 4) , B (- 1 , - 2) , C (2 , - 3) is right-angled at B , then find its surface area.

- 5 [a] Find the slope and the length of the intercepted part from y-axis of the straight line whose equation is  $3x + 2y = 6$

- [b] If the points A (0 , 1) , B (k , 3) , C (2 , 5) are collinear , find the value of k

7

El-Gharbia Governorate



*Answer the following questions :*

- 1 Choose the correct answer from the given answers :

- [1] The number of axes of symmetry of half a circle equals .....
- (a) 0                      (b) 1                      (c) 2                      (d) an infinite number.
- [2] The straight line whose equation is  $y = 3x + 4$  cuts from the positive part of y-axis a part of length ..... length units.
- (a) 2                      (b) 3                      (c) 4                      (d) 7
- [3] The image of the point (3 , - 2) by the reflection in the origin point is .....
- (a) (3 , 2)                      (b) (2 , 3)                      (c) (- 3 , 2)                      (d) (- 3 , - 2)
- [4] ABCD is a parallelogram ,  $m(\angle A) + m(\angle C) = 200^\circ$  , then  $m(\angle B) = \dots\dots\dots$
- (a)  $50^\circ$                       (b)  $80^\circ$                       (c)  $100^\circ$                       (d)  $120^\circ$

- 5 The equation of the straight line passing through the point (2 , 3) and parallel to y-axis is .....
- (a)  $x = 2$  (b)  $x = 3$  (c)  $y = 2$  (d)  $y = 3$
- 6 If  $2 \sin X = \tan X$  where  $X$  is the measure of an acute angle , then  $X = \dots\dots\dots$
- (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $150^\circ$
- 
- 2 [a] Without using calculator , find the value of  $X$  if :  $4 X = (\cos 30^\circ \tan 30^\circ \tan 45^\circ)^2$
- [b] If A (3 , 2) , B (4 , - 3) , C (- 1 , - 2) and D (- 2 , 3) are the vertices of a rhombus , find :
- 1 The coordinates of the point of intersection of the two diagonals.
- 2 The area of the rhombus.
- 
- 3 [a] If A (5 , 1) , B (3 , - 7) and C (1 , 3) , prove that the points A , B , C are not collinear.
- [b] Without using the calculator , find the value of :  $3 - \tan 45^\circ \div 4 \sin 30^\circ$
- 
- 4 [a] Find the equation of the straight line passing through the two points (2 , - 1) , (1 , 1)
- [b] XYZ is a right-angled triangle at Y where XY = 5 cm. and XZ = 13 cm.
- Find the value of :  $\tan X + \tan Z$
- 
- 5 [a] If the straight line  $L_1$  passes through the two points (3 , 1) , (2 , k) and the straight line  $L_2$  makes with the positive direction of the X-axis an angle of measure  $45^\circ$  , then find the value of k if the two straight lines are perpendicular.
- [b] Find the equation of the straight line which passes through (0 , 3) and is parallel to the straight line whose equation is  $x + 2 y - 1 = \text{zero}$

8

El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

- 1 [a] Choose the correct answer :
- 1 The slope of the straight line which is perpendicular to y-axis equals .....
- (a) undefined. (b) zero. (c) - 1 (d) 1
- 2 If the ratio between the measures of two complementary angles is 4 : 5 , then the measure of the smaller angle equals .....
- (a)  $40^\circ$  (b)  $50^\circ$  (c)  $80^\circ$  (d)  $100^\circ$
- 3 If  $\tan (X + 10)^\circ = \sqrt{3}$  , where  $(X + 10)^\circ$  is the measure of an acute angle , then the value of  $X = \dots\dots\dots$
- (a)  $20^\circ$  (b)  $40^\circ$  (c)  $50^\circ$  (d)  $70^\circ$

## Trigonometry and Geometry

- [b] If  $\overline{AB}$  is a diameter in the circle M where A (8, y), B (x, 3), M (5, 7), find the value of  $x + y$

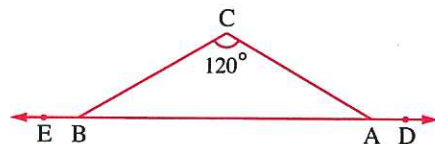
### 2 [a] Choose the correct answer :

- [1] If the point C is the midpoint of  $\overline{AB}$ , then  $(AB)^2 = \dots\dots\dots (AC)^2$   
 (a) 4 (b) 2 (c)  $\frac{1}{2}$  (d)  $\frac{1}{4}$

### [2] In the opposite figure :

If  $m(\angle C) = 120^\circ$ ,  $A \in \overleftrightarrow{DE}$ ,  $B \in \overleftrightarrow{DE}$ ,  
 then  $m(\angle DAC) + m(\angle EBC) = \dots\dots\dots$

- (a)  $60^\circ$  (b)  $180^\circ$   
 (c)  $240^\circ$  (d)  $300^\circ$



- [3] The area of the triangle which is bounded by the straight lines  $x = 0$ ,  $y = 0$ ,  $\frac{x}{3} - \frac{y}{4} = 1$  equals  $\dots\dots\dots$  square units.

- (a) -6 (b) 6 (c) 7 (d) 12

- [b] ABCD is a rhombus in which A (5, 3), B (6, -2), C (1, m), find the value of m

### 3 [a] Find the value of $x$ which satisfies that :

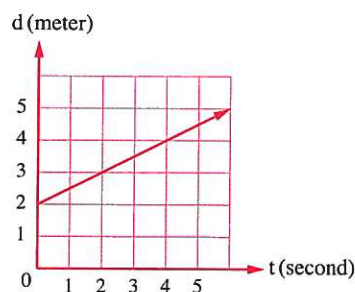
$3 \tan x - 4 \cos^2 60^\circ = 8 \sin^2 30^\circ$ , where  $x$  is the measure of an acute angle.

- [b] The opposite graph represents the motion of a particle moving with a uniform velocity (v) where the distance (d) is measured in meters and the time (t) in seconds.

**Find :** [1] The distance at the beginning of the motion.

[2] The velocity of the particle.

[3] The equation of the straight line representing the motion of the particle.



- [4] [a] If the straight line which passes through the two points A (4, 3), B (-2, -3) is parallel to the straight line whose equation is :  $(2k + 1)x - ky + 7 = 0$ , find the value of k

- [b] A ladder  $\overline{AB}$  is of length 6 meters, its upper edge A lies on a vertical wall and its other edge B on a horizontal floor. If C is the projection of the point A on the surface of the floor and its angle of slope on the surface of the floor was of measure  $60^\circ$ , then find the length of  $\overline{AC}$

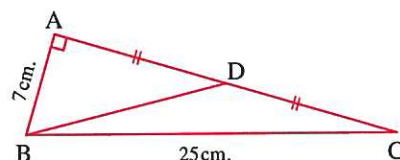


5 [a] In the opposite figure :

$$\overline{AB} \perp \overline{AC}, AB = 7 \text{ cm.}$$

$$, BC = 25 \text{ cm.}, AD = CD$$

$$\text{Find : } \tan C + \frac{1}{\tan (\angle ABD)}$$



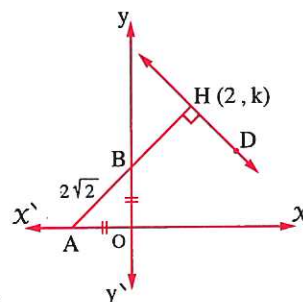
[b] In the opposite figure :

$$O \text{ is the origin point, } OA = OB, AB = 2\sqrt{2} \text{ length units.}$$

$$\text{If the point } H(2, k), \overrightarrow{AB} \perp \overrightarrow{HD}$$

, find : 1 The value of k

2 The equation of  $\overrightarrow{HD}$



9

Ismailia Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The triangle has two ..... angles at least.

(a) acute

(b) right

(c) obtuse

(d) straight

2 Two perpendicular straight lines , if the slope of one is  $-\frac{1}{4}$  and the slope of the other is  $4k$  , then  $k =$  .....

(a)  $-4$

(b)  $4$

(c)  $1$

(d)  $\frac{1}{4}$

3 ..... =  $7 \text{ cm.}$

(a)  $\overrightarrow{AB}$

(b)  $\overline{AB}$

(c)  $\overline{AB}$

(d)  $AB$

4 If  $\cos (X + 15)^\circ = \frac{1}{2}$  , then  $\tan X^\circ =$  .....

(a)  $\frac{1}{2}$

(b)  $\frac{\sqrt{3}}{2}$

(c)  $\frac{1}{\sqrt{2}}$

(d)  $1$

5 The distance between the two points  $(6, 0)$  ,  $(0, 8)$  equals ..... length units.

(a)  $6$

(b)  $8$

(c)  $10$

(d)  $14$

6 If  $3 \text{ cm.}$  ,  $7 \text{ cm.}$  ,  $L \text{ cm.}$  are the lengths of sides of a triangle , then one of the values of  $L =$  .....

(a)  $3$

(b)  $4$

(c)  $7$

(d)  $10$

2 [a] If  $2 \sin X^\circ = \tan^2 60^\circ - 2 \tan^2 45^\circ$  , find the value of  $X$   
(where  $X$  is the measure of an acute angle)

[b] Prove that the straight line whose equation is :  $4X - 2y = 7$  is parallel to the straight line which passes through the two points  $(1, 3)$  and  $(2, 5)$

**3 [a]** Prove that the triangle whose vertices are : A ( - 1 , - 1 ) , B ( 2 , 3 ) and C ( 6 , 0 ) is a right-angled triangle at B

**[b]** If the midpoint of  $\overline{AB}$  is C ( 4 , 2 ) where A ( X , 4 ) and B ( 6 , y ) , find the value of  $X + y$

**4 [a]** Find the equation of the straight line which passes through the point ( 2 , - 5 ) and is perpendicular to the straight line  $2X - y + 3 = 0$

**[b] Without using the calculator , prove that :**  $\tan 60^\circ = \frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$

**5 [a]** Find the equation of the straight line which makes an angle of measure  $45^\circ$  with the positive direction of the X-axis and the length of the intercepted part of the y-axis is 3 units from the positive part.

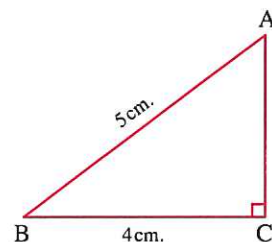
**[b] In the opposite figure :**

ABC is a right-angled triangle at C

, AB = 5 cm. , BC = 4 cm.

**Prove that :**

$$\sin A \cos B + \cos A \sin B = 1$$



**10**

**Suez Governorate**



**Answer the following questions : (Calculator is permitted)**

**1 Choose the correct answer from those given :**

**[1]** If  $\tan (X + 30^\circ) = \sqrt{3}$  , X is the measure of an acute angle , then  $X = \dots\dots\dots$

- (a)  $60^\circ$                       (b)  $30^\circ$                       (c)  $45^\circ$                       (d)  $90^\circ$

**[2]** The number of axes of symmetry of the equilateral triangle is  $\dots\dots\dots$

- (a) 1                              (b) 2                              (c) 3                              (d) 4

**[3]** If  $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$  , and the slope of  $\overleftrightarrow{AB} = \frac{1}{3}$  , then the slope of  $\overleftrightarrow{CD} = \dots\dots\dots$

- (a) 3                              (b) - 3                              (c)  $\frac{1}{3}$                               (d)  $-\frac{1}{3}$

**[4]** The distance between the point ( - 3 , 4 ) and y-axis is  $\dots\dots\dots$  length units.

- (a) 4                              (b) - 4                              (c) 3                              (d) - 3

**[5]** The area of the rhombus whose diagonals lengths are 6 cm. , 8 cm. is  $\dots\dots\dots$   $\text{cm}^2$

- (a) 48                              (b) 24                              (c) 14                              (d) 7

6 The volume of the cube whose edge length is 2 cm. is .....  $\text{cm}^3$

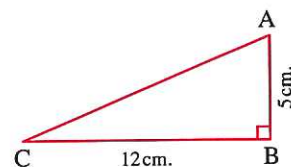
- (a) 8 (b) 4 (c) 16 (d) 64

2 [a] In the opposite figure :

ABC is a right-angled triangle at B

, AB = 5 cm. , BC = 12 cm.

Prove that :  $\cos A \cos C = \sin A \sin C$



[b] Find the equation of the straight line which passes through the point (0 , 3) and makes a positive angle of measure  $45^\circ$  with the positive direction of X-axis.

3 [a] If  $A = (-1 , 1)$  ,  $B = (0 , 5)$  ,  $C = (5 , 6)$  and  $D = (4 , 2)$

, prove that : ABCD is a parallelogram.

[b] Without using calculator , prove that :  $2 \sin 30^\circ = \tan^2 60^\circ - 2 \tan 45^\circ$

4 [a] If the point  $C = (5 , 4)$  is the midpoint of  $\overline{AB}$  ,  $A = (3 , -1)$  , find the coordinates of the point B

[b] Prove that the straight line passing through the points  $(-1 , 4)$  and  $(2 , 5)$  is parallel to the straight line whose equation is  $3y = x + 4$

5 [a] If the distance between the two points  $(x , 3)$  and  $(0 , 2)$  is  $5\sqrt{2}$  length units , find  $x$

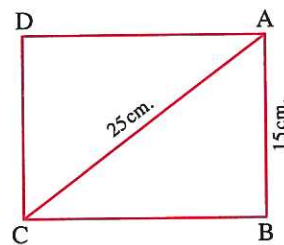
[b] In the opposite figure :

ABCD is a rectangle

, AB = 15 cm. , AC = 25 cm.

Find : 1  $m(\angle ACB)$

2 The area of the rectangle ABCD



11

Damietta Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The equation of the y-axis is .....

- (a)  $x = 0$  (b)  $y = x$  (c)  $y = 0$  (d)  $y = -x$

2 The sum of the measures of the accumulative angles at a point equals .....

- (a)  $90^\circ$  (b)  $180^\circ$  (c)  $270^\circ$  (d)  $360^\circ$



## Trigonometry and Geometry

- 3 The perpendicular distance between the two straight lines :

$X = 2$  and  $X + 3 = 0$  equals ..... length units.

(a) 6 (b) 5 (c) 3 (d) 2

- 4 If  $2 \sin X - 1 = 0$  (where  $X$  is an acute angle) , then  $m(\angle X) = \dots\dots\dots$

(a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$

- 5 The number of axes of symmetry of the isosceles triangle equals .....

(a) 3 (b) 2 (c) 1 (d) zero

- 6 ABC is a triangle , if  $m(\angle B) > m(\angle C)$  , then .....

(a)  $AC - AB < 0$  (b)  $AC - AB > 0$  (c)  $BC \leq AB$  (d)  $AC - AB \leq 0$

- 2 [a] Without using calculator , prove that :  $\tan^2 60^\circ - 2 \sin 45^\circ \cos 45^\circ = 2$

- [b] Find the equation of the straight line whose slope equals the slope of the straight line

$\frac{y-1}{x} = \frac{1}{3}$  and intercepts a negative part of y-axis of 4 length units.

- 3 [a] If  $3 \tan X = 4 \sin^2 30^\circ + 8 \cos^2 60^\circ$  , find the value of  $X$

(where  $X$  is the measure of an acute angle)

- [b] If the straight line  $L_1$  passes through the two points  $(3, 1)$  and  $(2, k)$  and the straight line  $L_2$  makes with the positive direction of the  $X$ -axis a positive angle whose measure is  $135^\circ$  , then find  $k$  if the two straight lines  $L_1$  and  $L_2$  are parallel.

- 4 [a] If the point  $C(4, y)$  is the midpoint of  $\overline{AB}$  where  $A(X, 3)$  and  $B(6, 5)$

, find the value of  $X + y$

- [b] If the points  $A(6, 0)$  ,  $B(2, 0)$  and  $C(4, 2\sqrt{3})$  are three points in a cartesian coordinates plane , prove that :  $\triangle ABC$  is equilateral.

- 5 [a] Find the equation of the straight line which passes through the point  $(-2, 3)$  and is perpendicular to the straight line whose equation is  $2y + x + 1 = 0$

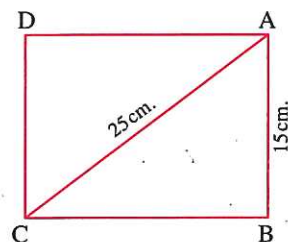
- [b] In the opposite figure :

ABCD is a rectangle in which

$AB = 15$  cm. and  $AC = 25$  cm.

Find : 1  $\cos(\angle ACB)$

2 The surface area of the rectangle ABCD



12

Beni Suef Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1 If  $\cos X = \frac{\sqrt{3}}{2}$  where  $X$  is the measure of an acute angle , then  $X = \dots\dots\dots$   
 (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- 2 If  $\overrightarrow{AB} \parallel \overrightarrow{CD}$  and the slope of  $\overrightarrow{AB} = \frac{2}{3}$  , then the slope of  $\overrightarrow{CD} = \dots\dots\dots$   
 (a)  $\frac{2}{3}$  (b)  $-\frac{2}{3}$  (c)  $\frac{3}{2}$  (d)  $-\frac{3}{2}$
- 3 The distance between the point  $(-5, 3)$  and the y-axis is  $\dots\dots\dots$  length units.  
 (a)  $-5$  (b)  $-3$  (c)  $3$  (d)  $5$
- 4 In the triangle ABC , if  $(AC)^2 < (AB)^2 + (BC)^2$  , then  $\angle B$  is  $\dots\dots\dots$   
 (a) an acute angle. (b) an obtuse angle. (c) a right angle. (d) a reflex angle.
- 5 ABCD is a parallelogram , if  $m(\angle A) = 80^\circ$  , then  $m(\angle C) = \dots\dots\dots$   
 (a)  $40^\circ$  (b)  $80^\circ$  (c)  $100^\circ$  (d)  $160^\circ$
- 6 If the lengths of two sides in a triangle are 5 cm. and 9 cm. , then the length of the third side can be equal to  $\dots\dots\dots$  cm.  
 (a) 3 (b) 4 (c) 14 (d) 8

2 [a] State the kind of the triangle whose vertices are the points A  $(-2, 4)$  , B  $(3, -1)$  , C  $(4, 5)$  with respect to its sides.

[b] If  $\tan X - 4 \cos 60^\circ \sin 30^\circ = \text{zero}$  , find the value of  $X$  where  $X$  is the measure of an acute angle.

3 [a]  $\triangle ABC$  is a right-angled triangle at B ,  $AB = 6$  cm. ,  $BC = 8$  cm.

1 Find the value of :  $\cos A \cos C - \sin A \sin C$

2 Calculate :  $m(\angle C)$

[b] Find the slope of the straight line whose equation is  $\frac{y-2}{x} = \frac{1}{2}$  , then find the length of the intercepted part of y-axis.

4 [a] Prove that :  $\sin^2 45^\circ = 2 \cos^2 30^\circ - 1$

[b] Find the equation of the straight line which passes through the point  $(3, -5)$  and is parallel to the straight line which makes with the positive direction of the  $X$ -axis an angle of measure  $45^\circ$

**5 [a]** If the point C (4 , y) is the midpoint of  $\overline{AB}$  where A = (6 , 5) and B = (X , 3) , find the value of X + y

**[b]** Prove that the straight line passing through the two points (− 2 , 5) and (− 2 , 4) is perpendicular to the straight line passing through the two points (2 , 3) and (5 , 3)

**13**

**Assiut Governorate**



*Answer the following questions : (Calculator is allowed)*

**1 Choose the correct answer from those given :**

**[1]** The distance between the point (− 4 , − 3) and the X-axis equals ..... length units.

- (a) − 3                      (b) 3                      (c) 4                      (d) − 4

**[2]** If  $\triangle ABC \equiv \triangle XYZ$  ,  $m(\angle A) = 50^\circ$  ,  $m(\angle B) = 60^\circ$  , then  $m(\angle X) + m(\angle Y) = \dots\dots\dots$

- (a)  $110^\circ$                       (b)  $120^\circ$                       (c)  $140^\circ$                       (d)  $70^\circ$

**[3]** If  $\sin X^\circ = \cos 30^\circ$  , then  $\tan X^\circ = \dots\dots\dots$  (where X is the measure of an acute angle)

- (a)  $\sqrt{3}$                       (b)  $\frac{1}{\sqrt{3}}$                       (c)  $\sqrt{2}$                       (d)  $\frac{1}{\sqrt{2}}$

**[4]** If two vertically opposite angles are supplementary , then the measure of each angle of them equals .....

- (a)  $45^\circ$                       (b)  $60^\circ$                       (c)  $90^\circ$                       (d)  $180^\circ$

**[5]** If the two straight lines  $y = \ell X + e$  ,  $y = n X + o$  are parallel , (where  $\ell$  , e , n , o are real numbers) , then  $\ell - n = \dots\dots\dots$

- (a) − 2                      (b) − 1                      (c) 1                      (d) zero

**[6]** A triangle has only one axis of symmetry and the lengths of two sides are 4 cm. and 8 cm. , so the length of the third side is ..... cm.

- (a) 12                      (b) 8                      (c) 4                      (d) 2

**2 [a] Without using the calculator , find the value of :  $\sin^2 60^\circ + \cos^2 60^\circ + \tan^2 45^\circ$**

**[b]** Find the equation of the straight line which passes through the two points (2 , − 1) , (1 , 1)

**3 [a]** If ABC is a right-angled triangle at B , AB = 12 cm. , AC = 13 cm. , find  $m(\angle C)$  to the nearest degree.

**[b]** If the straight line  $L_1$  passes through the two points (X , − 1) , (6 , 3) and the straight line  $L_2$  makes with the positive direction of the X-axis an angle of measure  $45^\circ$  , find the value of X if  $L_1$  is perpendicular to  $L_2$



4 [a] Without using the calculator , prove that :  $\cos 30^\circ = \frac{\sin 30^\circ \sin 60^\circ}{\sin 45^\circ \cos 45^\circ}$

[b] If the points A (1 , 0) , B (− 1 , 4) , C (7 , 8) and D (9 , 4) are in perpendicular coordinates plane , prove that the figure ABCD is a parallelogram.

5 [a] Find the slope of the straight line and the length of the y-intercept by the straight line whose equation is  $\frac{x}{2} + \frac{y}{3} = 1$

[b] In the opposite figure :

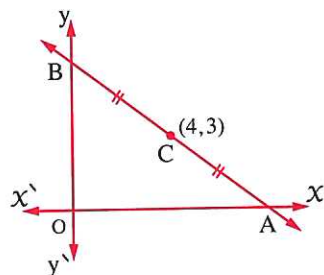
The point C is the midpoint of  $\overline{AB}$

where C (4 , 3)

Find (show the steps) :

1 The coordinates of the points A and B

2 The equation of  $\overleftrightarrow{AB}$



14

Luxor Governorate



Answer the following questions :

1 Choose the correct answer :

1 If C is an acute angle where  $\sin C = \cos C$  , then  $\tan C = \dots\dots\dots$

- (a) 1 (b)  $\sqrt{2}$  (c)  $\sqrt{3}$  (d)  $\frac{\sqrt{3}}{3}$

2 The straight line whose equation is  $2x + 3y = 6$  intersects the x-axis at the point  $\dots\dots\dots$

- (a) (2 , 0) (b) (3 , 0) (c) (0 , 2) (d) (0 , 3)

3 ABCD is a square , A (1 , 1) , C (4 , 4) , then its surface area =  $\dots\dots\dots$  square units.

- (a) 3 (b) 6 (c) 9 (d) 18

4 ABC is a triangle ,  $m(\angle A) : m(\angle B) : m(\angle C) = 3 : 4 : 5$  , then  $m(\angle B) = \dots\dots\dots$

- (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$

5 ABCD is a parallelogram , then  $\overline{AB} \parallel \dots\dots\dots$

- (a) CD (b)  $\overline{AD}$  (c) AD (d)  $\overline{CD}$

6 The length of the side opposite to the angle of measure  $30^\circ$  in the right-angled triangle equals  $\dots\dots\dots$  the length of the hypotenuse.

- (a) half (b) double (c) third (d) quarter

2 [a] If X is an acute angle , find the value of  $m(\angle X)$  when

$$\sin X = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

[b] Prove that the points A (0 , 1) , B (1 , 2) , C (2 , 3) are collinear.

## Trigonometry and Geometry

**3 [a]** Without using calculator , prove that :  $\tan 30^\circ \tan 60^\circ = \sin^2 45^\circ + \cos^2 45^\circ$

**[b]** If the straight line  $kx - 2y - 5 = 0$  makes a positive angle with the positive direction of the  $x$ -axis of measure  $45^\circ$  , find the value of  $k$

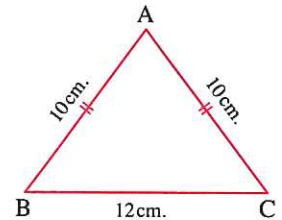
**4 [a]** If  $AB = 5$  units of length ,  $A(6, x)$  ,  $B(2, 0)$  , find the value of  $x$

**[b]** In the opposite figure :

$AB = AC = 10$  cm. ,  $BC = 12$  cm.

Find : **1**  $\cos B$

**2**  $m(\angle B)$



**5 [a]** Find the equation of the axis of symmetry of  $\overline{AB}$  where  $A(-1, 4)$  ,  $B(1, 2)$

**[b]** ABCD is a rectangle ,  $A(1, 1)$  ,  $B(3, 3)$  ,  $C(0, -3x)$  ,  $D(x, y)$

Find the value of each of  $x$  and  $y$

**15**

**New Valley Governorate**



**Answer the following questions : (Calculator is allowed)**

**1** Choose the correct answer from those given :

**1**  $\triangle ABC$  is a right-angled triangle at  $B$  ,  $m(\angle C) = 30^\circ$  ,  $AB = 6$  cm. , then  $AC = \dots\dots\dots$  cm.

- (a) 3                      (b) 6                      (c) 12                      (d) 9

**2** The distance between the two points  $(3, 0)$  and  $(0, -4)$  equals  $\dots\dots\dots$  length units.

- (a) 4                      (b) 3                      (c) 7                      (d) 5

**3** If  $\sin x = \frac{1}{2}$  where  $x$  is the measure of an acute angle , then  $\sin 2x = \dots\dots\dots$

- (a) 1                      (b)  $\frac{1}{4}$                       (c)  $\frac{\sqrt{3}}{2}$                       (d)  $\frac{1}{\sqrt{3}}$

**4** If the two straight lines whose slopes are  $-\frac{2}{3}$  and  $\frac{k}{2}$  are parallel , then  $k = \dots\dots\dots$

- (a)  $-\frac{4}{3}$                       (b)  $-\frac{3}{4}$                       (c)  $\frac{1}{3}$                       (d) 3

**5** The measure of each interior angle of the regular pentagon equals  $\dots\dots\dots$

- (a)  $60^\circ$                       (b)  $108^\circ$                       (c)  $120^\circ$                       (d)  $135^\circ$

**6** The two diagonals are equal in length and not perpendicular in the  $\dots\dots\dots$

- (a) square.                      (b) rhombus.                      (c) rectangle.                      (d) parallelogram.

- 2 [a]** Find the value of  $X$ , where  $0^\circ < X < 90^\circ$ , if :

$$\sin X = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

- [b]** Prove that the points A (1 , 1) , B (2 , 2) and C (3 , 3) are collinear.

- 3 [a]** Find the equation of the straight line which makes with the positive direction of  $X$ -axis a positive angle whose  $\tan = 2$  and intercepts from the positive part of  $y$ -axis 7 length units.

- [b]** Show the type of  $\triangle ABC$  such that A (-2 , 4) , B (3 , -1) and C (4 , 5) according to its side lengths.

- 4 [a]** If  $\triangle ABC$  is a right-angled triangle at C ,  $AB = 13$  cm. ,  $BC = 12$  cm. , **prove that :**  $\sin A \cos B + \cos A \sin B = 1$

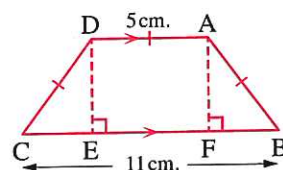
- [b]** Find the equation of the straight line which passes through the point (1 , 6) and the midpoint of  $\overline{AB}$  where A (1 , -2) , B (3 , -4)

- 5 [a]** Prove that the straight line passing through the two points (3 , -4) and (1 , -2) is perpendicular to the straight line that makes a positive angle of measure  $45^\circ$  with the positive direction of  $X$ -axis.

- [b] In the opposite figure :**

ABCD is an isosceles trapezium in which  
 $\overline{AD} \parallel \overline{BC}$  ,  $AB = AD = DC = 5$  cm.  
 ,  $BC = 11$  cm.

**Find :**  $m(\angle B)$  and the area of the trapezium ABCD



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# Examinations on Port Said Specifications



## on Trigonometry and Geometry

Exam

1

Port Said 2023

### First Multiple choice questions

Choose the correct answer from those given :

1 If  $\sin X = \frac{1}{2}$  where  $X$  is the measure of an acute angle , then  $\cos 2 X = \dots\dots\dots$

- (a)  $\frac{1}{2}$                       (b) 1                      (c)  $\frac{\sqrt{3}}{2}$                       (d)  $\frac{\sqrt{3}}{3}$

2 If  $\overrightarrow{AB} \parallel \overrightarrow{CD}$  and the slope of  $\overrightarrow{AB} = \frac{2}{3}$  , then the slope of  $\overrightarrow{CD} = \dots\dots\dots$

- (a)  $\frac{3}{2}$                       (b)  $-\frac{3}{2}$                       (c)  $\frac{2}{3}$                       (d)  $-\frac{2}{3}$

3 The radius length of the circle whose centre is (0 , 0) and passes through the point (3 , 4) equals  $\dots\dots\dots$  length units.

- (a) 3                      (b) 4                      (c) 5                      (d) 7

4 The triangle whose side lengths are 3 cm. , 4 cm. , 5 cm is  $\dots\dots\dots$

- (a) acute-angled.                      (b) right-angled.  
(c) obtuse-angled.                      (d) with congruent angles.

5 In the right-angled triangle ABC , if  $m(\angle B) = 90^\circ$  , then  $\sin A - \cos C = \dots\dots\dots$

- (a)  $2 \sin A$                       (b)  $2 \cos C$                       (c) zero                      (d) 1

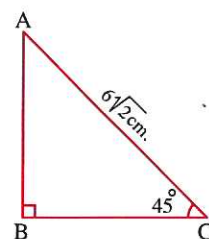
6 If  $\overline{AB}$  is a diameter in a circle where A (3 , - 5) and B (5 , 1) , then the centre of this circle is the point  $\dots\dots\dots$

- (a) (4 , - 2)                      (b) (4 , 2)                      (c) (2 , - 2)                      (d) (8 , - 4)

7 In the opposite figure :

AB =  $\dots\dots\dots$  cm.

- (a) 3                      (b) 4  
(c) 5                      (d) 6



8 A square of perimeter = 16 cm. , its area =  $\dots\dots\dots$

- (a)  $4 \text{ cm}^2$                       (b)  $8 \text{ cm}^2$                       (c)  $16 \text{ cm}^2$                       (d)  $24 \text{ cm}^2$

- 9 The equation of the line which passes through the point  $(2, -3)$  and is parallel to y-axis is .....
- (a)  $y = -3$  (b)  $x = 2$  (c)  $y = 3$  (d)  $x = -2$
- 
- 10 The slope of the line that makes an angle of measure  $45^\circ$  with the positive direction of X-axis is .....
- (a)  $\frac{1}{2}$  (b) 1 (c)  $\sqrt{3}$  (d)  $\frac{\sqrt{3}}{2}$
- 
- 11 The complementary angle for the angle of measure  $60^\circ$  is an angle of measure .....
- (a)  $120^\circ$  (b)  $0^\circ$  (c)  $30^\circ$  (d)  $90^\circ$
- 
- 12  $4 \cos 60^\circ \sin 30^\circ = \dots\dots\dots$
- (a)  $\frac{1}{2}$  (b)  $\frac{1}{4}$  (c) 4 (d) 1
- 
- 13 The line whose equation is  $y = 3x + 4$  cuts from the positive part of the y-axis ..... length units.
- (a) 2 (b) 3 (c) 4 (d) 7
- 
- 14 The slope of the line that is parallel to the X-axis is .....
- (a) -1 (b) zero (c) 1 (d) undefined.
- 
- 15 The sum of the measures of all interior angles of any quadrilateral is .....
- (a)  $90^\circ$  (b)  $180^\circ$  (c)  $360^\circ$  (d)  $540^\circ$
- 
- 16 For any angle of measure  $a$ , then  $\frac{\sin a}{\cos a} = \dots\dots\dots$
- (a)  $\sin a \cos a$  (b) 1 (c)  $\tan a$  (d) -1
- 
- 17 The slope of the line whose equation is :  $2x - 2y = 3$  is .....
- (a) 3 (b) 2 (c) -2 (d) 1
- 
- 18 If  $\sin H = 0.6214$ , then  $m(\angle H) \approx \dots\dots\dots$
- (a)  $55^\circ 38'$  (b)  $38^\circ 25'$  (c)  $83^\circ 52'$  (d)  $48^\circ 52'$
- 
- 19 The length of the perpendicular from  $(3, -4)$  to the X-axis is ..... length units.
- (a) 3 (b) -4 (c) 4 (d) 5
- 
- 20  $\sin 70^\circ = \cos \dots\dots\dots$
- (a)  $110^\circ$  (b)  $20^\circ$  (c)  $290^\circ$  (d)  $360^\circ$
- 
- 21 The line whose equation is :  $2x + 3y = 0$  passes through the point .....
- (a)  $(3, 2)$  (b)  $(2, 3)$  (c)  $(0, 0)$  (d)  $(1, -1)$

## Second Essay questions

- 22** Find the equation of  $\overleftrightarrow{AB}$  which passes through A (0 , 4) and B (4 , 0)
- 23** ABC is a triangle in which  $\angle B$  is a right angle , AB = 5 cm. and BC = 12 cm.  
Find :  $\sin^2 A + \cos^2 A$
- 24** Show the type of  $\Delta ABC$  with respect to its sides where : A (3 , 3) , B (1 , 5) and C (1 , 3)

## Exam 2 Port Said 2024

## First Multiple choice questions

Choose the correct answer from those given :

- 1** If the origin point is the midpoint of  $\overleftrightarrow{AB}$  and A (5 , - 2) , then B = .....  
(a) (2 , 5)                      (b) (5 , - 2)                      (c) (- 2 , - 5)                      (d) (- 5 , 2)
- 2**  $2 \sin 30^\circ \tan 60^\circ = \dots\dots\dots$   
(a)  $\sqrt{3}$                       (b) 3                      (c)  $\frac{\sqrt{3}}{2}$                       (d)  $\frac{1}{2}$
- 3** The distance between the two points (3 , a) and (- 1 , a) equals ..... length units.  
(a) 3                      (b) 4                      (c) 9                      (d) 16
- 4** If X , y are the measures of two complementary angles and  $\sin X = \frac{3}{5}$  , then  $\cos y = \dots\dots\dots$   
(a)  $\frac{4}{5}$                       (b)  $\frac{3}{5}$                       (c)  $\frac{5}{4}$                       (d)  $\frac{5}{3}$
- 5**  $44.125^\circ = \dots\dots\dots$  in degrees , minutes and seconds.  
(a)  $44^\circ 7' 30''$                       (b)  $44^\circ 30' 7''$                       (c)  $44^\circ 17' 30''$                       (d)  $44^\circ 30' 17''$
- 6** The sum of measures of all interior angles of a triangle equals .....  
(a)  $120^\circ$                       (b)  $150^\circ$                       (c)  $180^\circ$                       (d)  $360^\circ$
- 7** For any acute angle of measure a , then  $\sin a - \cos a \tan a = \dots\dots\dots$   
(a) - 1                      (b) 0                      (c) 1                      (d) 2
- 8** If  $m_1$  ,  $m_2$  are the slopes of two parallel lines , then .....  
(a)  $m_1 - m_2 = 0$                       (b)  $m_1 + m_2 = 0$                       (c)  $m_1 m_2 = 0$                       (d)  $m_1 - m_2 \neq 0$
- 9** A circle its centre is the origin point and its radius length equals 5 cm. , then the point (3 , 4) lies ..... the circle.  
(a) inside                      (b) outside                      (c) on                      (d) on the centre of

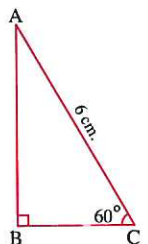


- 10 If  $X \cos 60^\circ = \tan 45^\circ$ , then  $X = \dots\dots\dots$   
 (a) 2 (b) 1 (c)  $\frac{1}{2}$  (d)  $\sqrt{2}$
- 
- 11 If ABCD is a square, then  $m(\angle ABD) = \dots\dots\dots$   
 (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- 
- 12 The product of the slopes of two perpendicular lines equals  $\dots\dots\dots$   
 (a) zero (b) 1 (c) -1 (d)  $\frac{1}{2}$
- 
- 13 The line whose equation is :  $y - 3X + 1 = 0$  passes through the point  $\dots\dots\dots$   
 (a) (1 , 2) (b) (2 , 1) (c) (0 , 3) (d) (3 , 0)
- 
- 14 If  $\sin(X + 7)^\circ = \frac{1}{2}$  where  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots$   
 (a)  $60^\circ$  (b)  $30^\circ$  (c)  $23^\circ$  (d)  $13^\circ$
- 
- 15 The number of symmetry axes of an isosceles triangle equals  $\dots\dots\dots$   
 (a) zero (b) 1 (c) 2 (d) 3
- 
- 16 If  $A = (5, 7)$  and  $B = (1, -1)$ , then the midpoint of  $\overline{AB}$  is  $\dots\dots\dots$   
 (a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)
- 
- 17 ABC is a triangle in which  $m(\angle A) = 85^\circ$ ,  $\sin B = \cos B$ , then  $m(\angle C) = \dots\dots\dots$   
 (a)  $30^\circ$  (b)  $45^\circ$  (c)  $50^\circ$  (d)  $60^\circ$
- 
- 18 The equation of the line that passes through the origin point and has slope = 1 is  $\dots\dots\dots$   
 (a)  $y = X$  (b)  $y = -X$  (c)  $y = 2X$  (d)  $y = 0$
- 
- 19 The equation of the line which passes through the point  $(-5, 3)$  and is parallel to  $X$ -axis is  $\dots\dots\dots$   
 (a)  $X = -5$  (b)  $y = -5$  (c)  $y = 3$  (d)  $X = 3$
- 
- 20 The line whose equation is :  $3y = 2X - 6$  cuts from the  $y$ -axis a part of length  $\dots\dots\dots$  units.  
 (a) 6 (b) -6 (c) 2 (d) -2
- 

21 In the opposite figure :

AB =  $\dots\dots\dots$  cm.

- (a) 3 (b)  $2\sqrt{3}$   
 (c)  $3\sqrt{3}$  (d)  $\sqrt{6}$



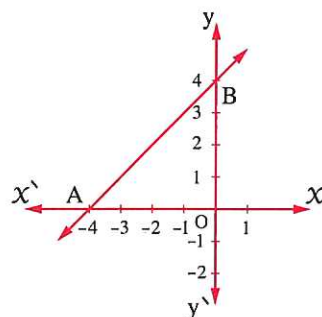
## Second Essay questions

22 If  $\cos H = \sin^2 45^\circ \tan 60^\circ$ , find the measure of the acute angle  $H$

23 Show that  $A(-3, -1)$ ,  $B(6, 5)$  and  $C(3, 3)$  are three collinear points.

24 In the opposite figure :

Find the equation of  $\overleftrightarrow{AB}$  which cuts from the negative the  $X$ -axis and positive the  $y$ -axis two equal parts of length 4 length units.



## Exam 3

### First Multiple choice questions

Choose the correct answer from those given :

1 If  $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$  and the slope of  $\overleftrightarrow{AB} = \frac{1}{2}$ , then the slope of  $\overleftrightarrow{CD} = \dots\dots\dots$

- (a) 2                      (b)  $\frac{1}{2}$                       (c)  $-\frac{1}{2}$                       (d) -2

2 The perpendicular distance between the two straight lines :  $y + 1$ ,  $y + 3 = 0$  equals  $\dots\dots\dots$  length units.

- (a) 4                      (b) 2                      (c) 1                      (d) 5

3 The equation of the straight line which is passing through  $(2, 3)$  and parallel to the  $X$ -axis is  $\dots\dots\dots$

- (a)  $x = 2$                       (b)  $x = 3$                       (c)  $y = 2$                       (d)  $y = 3$

4 The number of the axes of symmetry of the isosceles triangle is  $\dots\dots\dots$

- (a) 1                      (b) 2                      (c) 3                      (d) 4

5 The distance between  $(4, 3)$  and the  $y$ -axis is  $\dots\dots\dots$  length units.

- (a) -3                      (b) -4                      (c) 3                      (d) 4

6 The point  $(-1, 3)$  is the image of the point  $(5, 3)$  by reflection in the point  $\dots\dots\dots$

- (a)  $(0, 0)$                       (b)  $(4, 6)$                       (c)  $(2, 3)$                       (d)  $(-2, -3)$

7 If  $\Delta ABC$  is right-angled at  $A$ , then  $\sin B = \dots\dots\dots$

- (a)  $\frac{AC}{BC}$                       (b)  $\frac{AB}{AC}$                       (c)  $\frac{BC}{AC}$                       (d)  $\frac{AC}{AB}$

- 8 The slope of the straight line :  $3x + 2y - 5 = 0$  is .....  
 (a)  $\frac{3}{2}$  (b)  $-\frac{3}{2}$  (c)  $\frac{2}{3}$  (d)  $\frac{5}{2}$
- 
- 9 If  $\sin X = \frac{1}{2}$ , where  $X$  is the measure of an acute angle, then  $\sin 2X = \dots\dots\dots$   
 (a)  $\frac{1}{4}$  (b) 1 (c)  $\sqrt{3}$  (d)  $\frac{\sqrt{3}}{2}$
- 
- 10 The parallelogram whose diagonals are perpendicular and equal in length is .....  
 (a) a square. (b) a rhombus. (c) a rectangle. (d) a trapezium.
- 
- 11 If  $\triangle ABC$  is right-angled at B and  $\sin A = \frac{3}{5}$ , then  $\cos C = \dots\dots\dots$   
 (a)  $\frac{5}{3}$  (b)  $\frac{4}{5}$  (c)  $\frac{5}{4}$  (d)  $\frac{3}{5}$
- 
- 12 The distance between  $(3, -4)$  and the origin point is ..... length units.  
 (a) 5 (b) 1 (c)  $-1$  (d)  $-5$
- 
- 13 The straight line :  $x + 2y = 6$  cuts from the positive part of the y-axis a part of length ..... units.  
 (a) 6 (b) 3 (c) 2 (d)  $-3$
- 
- 14 If  $\tan (X + 10^\circ) = 1$  where  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots$   
 (a)  $45^\circ$  (b)  $35^\circ$  (c)  $55^\circ$  (d)  $50^\circ$
- 
- 15 If  $\triangle XYZ$  is right-angled at Y,  $XY = 12$  cm.,  $YZ = 5$  cm., then  $\sin^2 X + \sin^2 Z = \dots\dots\dots$   
 (a) 1 (b)  $\frac{25}{144}$  (c)  $\frac{144}{169}$  (d)  $\frac{25}{169}$
- 
- 16 The angle of measure  $40^\circ$  complements an angle of measure .....  
 (a)  $50^\circ$  (b)  $80^\circ$  (c)  $90^\circ$  (d)  $140^\circ$
- 
- 17 If  $a \sin 30^\circ = 4 \sin 45^\circ \cos 45^\circ$ , then  $a = \dots\dots\dots$   
 (a) 2 (b) 4 (c) 8 (d) 16
- 
- 18 The slope of the straight line passing through the two points  $(3, -1)$ ,  $(1, -2)$  is .....  
 (a) 2 (b)  $\frac{1}{2}$  (c)  $-2$  (d)  $-\frac{1}{2}$
- 
- 19 If C  $(2, 1)$  is the midpoint of  $\overline{AB}$  where A  $(4, -1)$ , then B = .....  
 (a)  $(6, 0)$  (b)  $(2, 2)$  (c)  $(0, 3)$  (d)  $(2, 0)$



## Trigonometry and Geometry

- 20** If the straight line whose equation is :  $aX + y = 5$  is parallel to the straight line passing through  $(1, 4)$ ,  $(3, 5)$ , then  $a = \dots\dots\dots$
- (a)  $-\frac{1}{4}$                       (b)  $\frac{3}{5}$                       (c)  $-\frac{1}{2}$                       (d)  $\frac{1}{2}$
- 
- 21** If  $\sin 2X = 2 \sin 30^\circ \cos 60^\circ$ , where  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots$
- (a)  $15^\circ$                       (b)  $30^\circ$                       (c)  $45^\circ$                       (d)  $60^\circ$

### Second Essay questions

- 22** Determine the type of  $\triangle ABC$  where  $A(1, 1)$ ,  $B(5, 1)$ ,  $C(3, 4)$  according to the lengths of its sides.
- 
- 23** Find the equation of the straight line which passes through  $(3, -5)$  and parallel to the straight line :  $X + 3y = 7$
- 
- 24** Find the value of :  $\cos 60^\circ \sin 30^\circ - \sin 60^\circ \tan 60^\circ + \cos^2 30^\circ$

### Exam 4

#### First Multiple choice questions

Choose the correct answer from those given :

- 1** The equation of the straight line which is perpendicular to the  $y$ -axis is  $\dots\dots\dots$
- (a)  $X = 0$                       (b)  $y = X$                       (c)  $y = -X$                       (d)  $y = 0$
- 
- 2** If  $X \cos 60^\circ = \tan 45^\circ$ , then  $X = \dots\dots\dots$
- (a)  $\frac{1}{2}$                       (b)  $2$                       (c)  $\frac{1}{\sqrt{2}}$                       (d)  $\frac{\sqrt{3}}{2}$
- 
- 3** The measure of the exterior angle of the equilateral triangle is  $\dots\dots\dots$
- (a)  $120^\circ$                       (b)  $90^\circ$                       (c)  $60^\circ$                       (d)  $30^\circ$
- 
- 4** The slope of the straight line that makes with the positive direction of the  $X$ -axis a positive angle of measure  $\theta$  equals  $\dots\dots\dots$
- (a)  $\sin \theta$                       (b)  $\cos \theta$                       (c)  $\frac{\sin \theta}{\cos \theta}$                       (d)  $\sin \theta + \cos \theta$
- 
- 5** The slope of the straight line which makes an angle of measure  $60^\circ$  with the positive direction of the  $X$ -axis is  $\dots\dots\dots$
- (a)  $\frac{1}{2}$                       (b)  $\frac{\sqrt{3}}{2}$                       (c)  $\frac{1}{\sqrt{3}}$                       (d)  $\sqrt{3}$

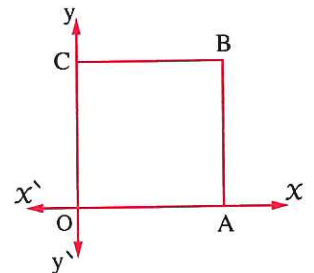
- 6 If the y-axis bisects  $\overline{AB}$  such that A (3 , 2) , B (X , y) , then X = .....  
 (a) - 3 (b) - 2 (c) 2 (d) 3
- 
- 7 If A (2 , - 1) , B (- 4 , 3) , then the midpoint of  $\overline{AB}$  is .....  
 (a) (2 , 2) (b) (- 2 , - 4) (c) (- 1 , 1) (d) (3 , - 2)
- 
- 8 If  $\cos X = \frac{\sqrt{3}}{2}$  , where X is the measure of an acute angle , then  $\sin 2 X =$  .....  
 (a) 1 (b)  $\frac{\sqrt{3}}{2}$  (c) - 2 (d)  $\frac{1}{\sqrt{3}}$
- 
- 9 If  $\Delta XYZ$  is right-angled at Y ,  $XY = 16$  cm. ,  $m(\angle X) = 54^\circ$  , then  $YZ \approx$  ..... cm.  
 (a) 22 (b) 14 (c) 12 (d) 15
- 
- 10 The distance between the two points (- 2 , 5) , (- 2 , - 4) is ..... length units.  
 (a) - 2 (b) 1 (c) 0 (d) 9
- 
- 11 If A lies on the axis of symmetry of  $\overline{XY}$  , then  $\overline{AX} \dots\dots\dots \overline{AY}$   
 (a) // (b) = (c)  $\equiv$  (d)  $\perp$
- 
- 12 If  $\Delta ABC$  is right-angled at B ,  $AB = 8$  cm. ,  $BC = 6$  cm. , then  $\sin C =$  .....  
 (a)  $\frac{3}{4}$  (b)  $\frac{4}{3}$  (c)  $\frac{3}{5}$  (d)  $\frac{4}{5}$
- 
- 13 The straight line passing through (2 , 1) , (4 , 0) is parallel to the straight line whose equation is .....  
 (a)  $2X + y = 1$  (b)  $y = \frac{1}{2}X + 3$  (c)  $X + 2y = 5$  (d)  $2X + 3y = 3$
- 
- 14 If  $AB = 5$  length units , A (4 , - 1) , then B could be .....  
 (a) (- 1 , 4) (b) (2 , 1) (c) (1 , 3) (d) (5 , 0)
- 

**15 In the opposite figure :**

OABC is a square of side length 4 cm.

, then the equation of  $\overleftrightarrow{AC}$  is .....

- (a)  $y = X + 4$  (b)  $y = X - 4$   
 (c)  $y = -X + 4$  (d)  $X = 4y + 4$



- 16 If  $\Delta ABC$  is right-angled at B , then  $\sin C + \cos C \dots\dots\dots 1$

- (a) = (b) > (c) < (d)  $\leq$

## Trigonometry and Geometry

- 17 The sum of measures of the accumulative angles at a point equals .....  
(a)  $90^\circ$  (b)  $180^\circ$  (c)  $270^\circ$  (d)  $360^\circ$
- 
- 18  $\overline{AB}$  is a diameter in a circle whose centre is M (2, -1), if A (-2, 3), then B = .....  
(a) (0, 1) (b) (0, 2) (c) (2, -2) (d) (6, -5)
- 
- 19 If  $\triangle ABC$  is right-angled at B,  $2 AB = \sqrt{3} AC$ , then  $m(\angle C) = \dots\dots\dots$   
(a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $75^\circ$
- 
- 20 The straight line whose equation is :  $2x - 3y = 6$  cuts from the negative part of the y-axis a part of length ..... units.  
(a) 6 (b) 2 (c) -3 (d) 3
- 
- 21 If  $\cos 70^\circ = \sin X$  where  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots$   
(a)  $60^\circ$  (b)  $45^\circ$  (c)  $30^\circ$  (d)  $20^\circ$

### Second Essay questions

- 22 Prove that :  $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$
- 
- 23 Prove that the points A (-3, -1), B (6, 5), C (2, 4), D (-7, -2) are the vertices of a parallelogram.
- 
- 24 Find the equation of the straight line whose slope = 2 and passes through the point (1, 3)

## Exam 5

### First Multiple choice questions

Choose the correct answer from those given :

- 1 The equation of the y-axis is .....  
(a)  $x = 0$  (b)  $y = 0$  (c)  $x = y$  (d)  $y = 1$
- 
- 2 If C (X, 1) is the midpoint of  $\overline{AB}$  where A (5, y), B (3, 3), then  $X + y = \dots\dots\dots$   
(a) 5 (b) 3 (c) -1 (d) 4
- 
- 3 The angle whose measure is  $30^\circ$  supplements an angle of measure .....  
(a)  $60^\circ$  (b)  $120^\circ$  (c)  $150^\circ$  (d)  $180^\circ$
- 
- 4 If  $\sin X = \frac{1}{2}$  where  $X$  is the measure of an acute angle, then  $\tan (X + 15^\circ) = \dots\dots\dots$   
(a) 1 (b)  $\frac{1}{2}$  (c)  $-\frac{1}{2}$  (d) -1



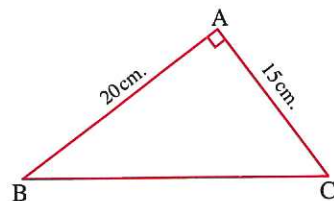
- 5 ABCD is a parallelogram , its diagonals intereseect at M where A (3 , - 1) , C (1 , 7) , then the point M is .....

(a) (3 , 1) (b) (2 , 3) (c) (3 , 2) (d) (1 , 3)

- 6 In the opposite figure :

$$\cos C \cos B - \sin C \sin B = \dots\dots\dots$$

(a) 0 (b) 1  
(c)  $\frac{3}{5}$  (d)  $\frac{4}{5}$



- 7 A circle its centre is the origin point and its radius length is 2 length units. Which of the following points lies on the circle ?

(a) (1 , 2) (b) (- 2 , 1) (c)  $(\sqrt{3} , 1)$  (d)  $(\sqrt{2} , 1)$

- 8 The slope of the straight line which makes an angle of measure  $45^\circ$  with the positive direction of the X-axis is .....

(a)  $\frac{1}{\sqrt{2}}$  (b)  $\frac{1}{2}$  (c) 1 (d) - 1

- 9 The equation of the straight line which passes through (2 , - 1) and is parallel to the X-axis is .....

(a)  $x = 2$  (b)  $y = 2$  (c)  $x = - 1$  (d)  $y = - 1$

- 10 The image of the point (3 , 2) by reflection in the origin point is .....

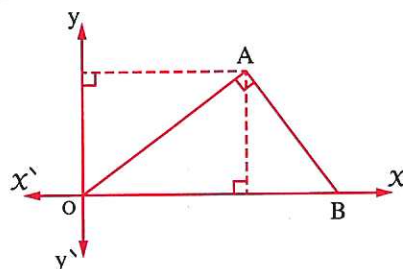
(a) (- 3 , - 2) (b) (- 3 , 2) (c) (3 , - 2) (d) (2 , 3)

- 11 In the opposite figure :

$\Delta ABO$  is right-angled at A , A (6 , 3)

, then  $\tan (\angle AOB) = \dots\dots\dots$

(a) 2 (b)  $\frac{1}{2}$   
(c)  $\frac{\sqrt{3}}{2}$  (d)  $-\frac{1}{2}$



- 12 The distance between the two points (3 , 2) , (- 1 , 5) is ..... length units.

(a) 4 (b) 5 (c) 6 (d)  $5\sqrt{2}$

- 13  $\sin 30^\circ \cos 60^\circ = \dots\dots\dots$

(a)  $\frac{\sqrt{3}}{2}$  (b)  $\frac{1}{4}$  (c)  $\frac{1}{2}$  (d)  $2\sqrt{3}$

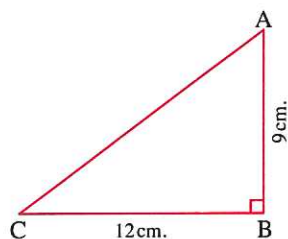
## Trigonometry and Geometry

- 14 The straight line whose equation is :  $y - x = 3$  makes an angle with the positive direction of the  $x$ -axis of measure .....  
(a)  $45^\circ$  (b)  $30^\circ$  (c)  $60^\circ$  (d)  $135^\circ$
- 
- 15 If  $\cos x = \sin 30^\circ \tan 45^\circ$  where  $x$  is the measure of an acute angle , then  $x =$  .....  
(a)  $30^\circ$  (b)  $60^\circ$  (c)  $90^\circ$  (d)  $180^\circ$
- 
- 16 If  $m_1$  and  $m_2$  are the slopes of two parallel straight lines , then .....  
(a)  $m_1 m_2 = 2$  (b)  $m_1 m_2 = 1$  (c)  $m_1 - m_2 = 0$  (d)  $m_1 m_2 = -1$
- 
- 17 If  $\triangle ABC$  is right-angled at B ,  $AB = 3 BC$  , then  $\tan C =$  .....  
(a) 3 (b)  $\frac{1}{3}$  (c)  $\frac{3}{\sqrt{10}}$  (d)  $\frac{1}{\sqrt{10}}$
- 
- 18 The number of the axes of symmetry of the equilateral triangle is .....  
(a) 0 (b) 1 (c) 2 (d) 3
- 
- 19 The straight line whose equation is :  $\frac{x}{2} - \frac{y}{3} = 6$  cuts from the positive part of the  $x$ -axis a part of length ..... units.  
(a) 3 (b) 12 (c) 6 (d) 18
- 
- 20 The straight line whose equation is :  $2x + y - 2 = 0$  is perpendicular to the straight line whose equation is .....  
(a)  $y = 2x + 2$  (b)  $2y - x = 3$  (c)  $y = 2x$  (d)  $2x + 3y = 0$

21 In the opposite figure :

$$\sin A \cos C + \cos A \sin C = \dots\dots\dots$$

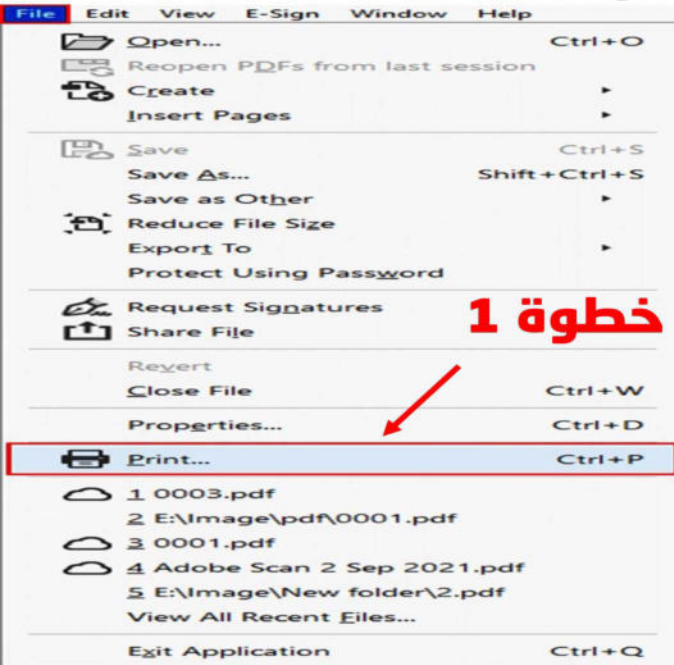
- (a) 1 (b)  $\frac{1}{2}$   
(c)  $\frac{3}{5}$  (d)  $\frac{4}{5}$



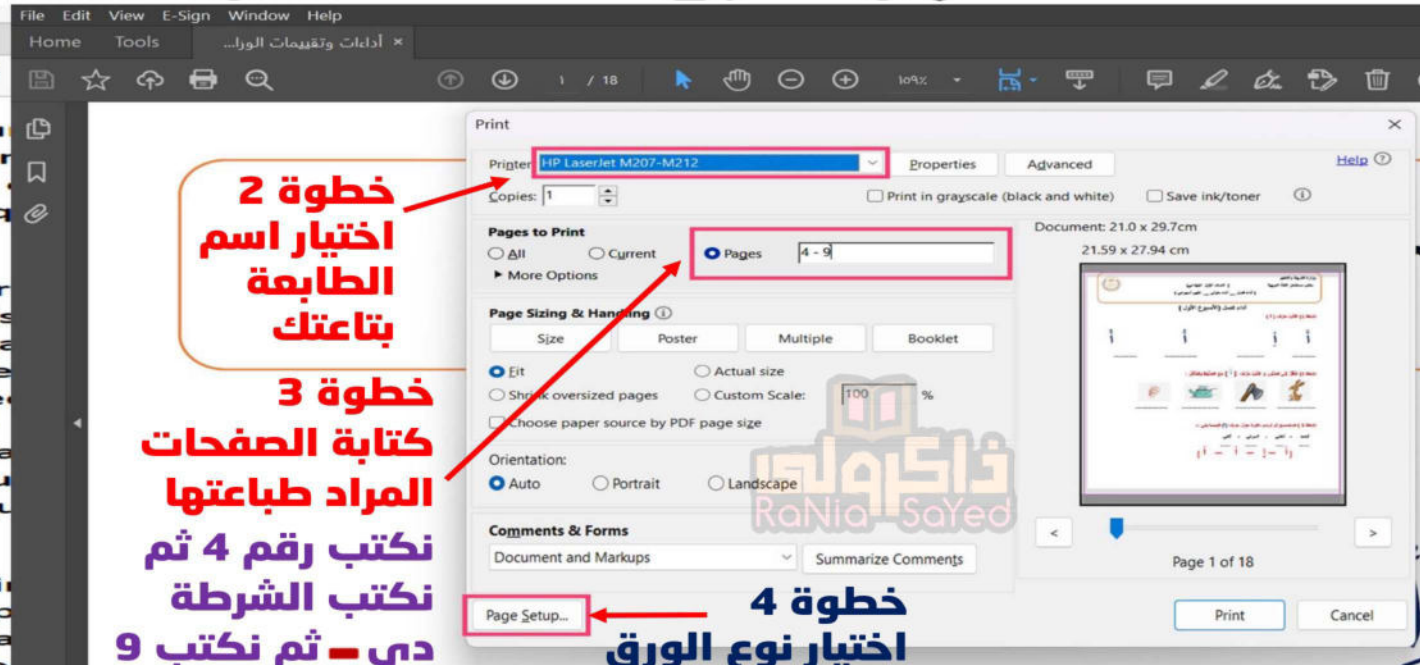
### Second Essay questions

- 22 Find the value of  $x$  where :  $\sin x = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$  ,  $0^\circ < x < 90^\circ$
- 
- 23 Prove that the points A (3 , - 1) , B (- 4 , 6) , C (2 , - 2) lie on one circle whose centre is M (- 1 , 2)
- 
- 24 Find the equation of the straight line which passes through (1 , 3) and is perpendicular to the straight line :  $x + 3y = 4$

# كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



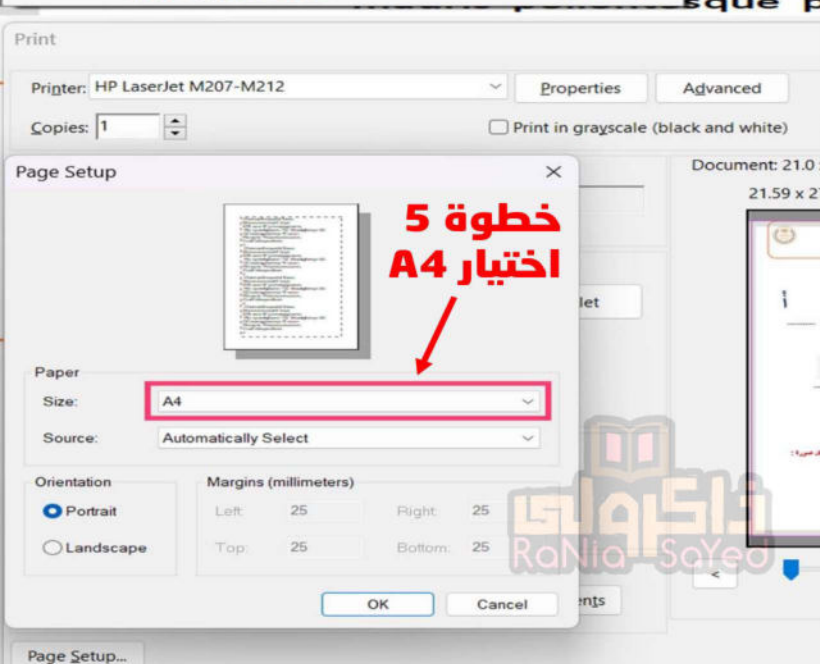
خطوة 1



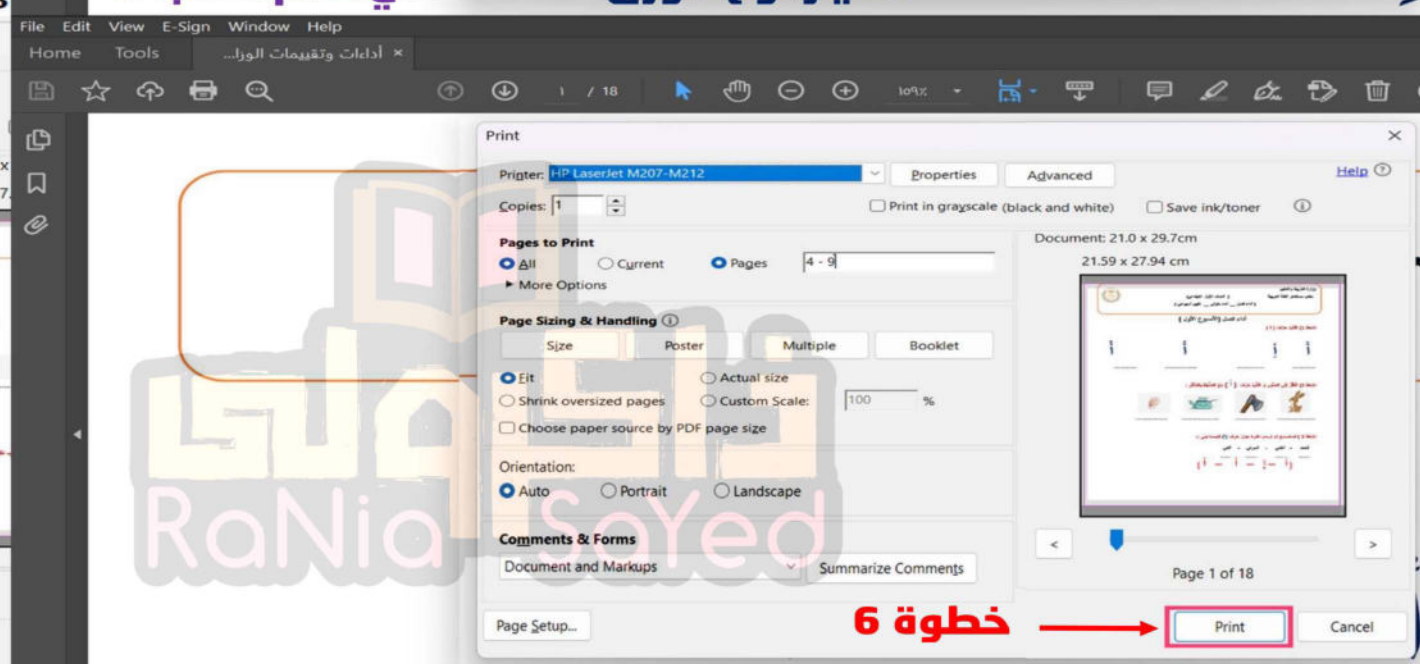
خطوة 2  
اختيار اسم  
الطابعة  
بتاعتك

خطوة 3  
كتابة الصفحات  
المراد طباعتها  
نكتب رقم 4 ثم  
نكتب الشرطة  
دي - ثم نكتب 9

خطوة 4  
اختيار نوع الورق



خطوة 5  
اختيار A4



خطوة 6



حمل الآن

مجاناً وحصرياً

# امتحانات رقم (2)

## الترم الاول



1

## Cairo Governorate



**Answer the following questions : (Calculator is allowed)**

**1 Choose the correct answer from those given :**

- 1** If  $a \in \mathbb{R}$  where  $a + (-a) = (-a) + a = 0$ , then each of the two numbers  $a$ ,  $(-a)$  is the ..... of the other.
- (a) additive identity                      (b) additive inverse  
(c) multiplicative identity              (d) multiplicative inverse
- 2** If  $(X - 4, 3) = (0, 3)$ , then  $X =$  .....
- (a) 1                      (b) 2                      (c) 3                      (d) 4
- 3** If  $\frac{a}{b} = \frac{c}{d}$  and  $a = cm$ , then  $b =$  ..... "where  $m \in \mathbb{R}^*$ "
- (a)  $a c$                       (b)  $a d$                       (c)  $d m$                       (d)  $d c$
- 4**  $(\sqrt{5} + 2)(\sqrt{5} - 2) =$  .....
- (a) 1                      (b) 3                      (c) 4                      (d) 5
- 5** One of the measures of dispersion is the .....
- (a) arithmetic mean.                      (b) median.                      (c) range.                      (d) mode.
- 6**  $|-2|$  ..... zero.
- (a)  $=$                       (b)  $<$                       (c)  $\leq$                       (d)  $>$

**2 [a]** If  $y \propto X$  and  $y = 5$  when  $X = 15$ , find the value of  $X$  when  $y = 3$

- [b]** If  $X = \{1, 2, 3\}$  and  $Y = \{1, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $2a = b$ " for each  $a \in X, b \in Y$
- 1** Write  $R$  and represent it by an arrow diagram.
- 2** Is  $R$  a function or not ?

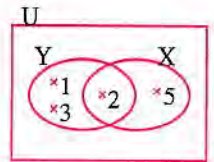
**3 [a]** Calculate the standard deviation for the values : 1 , 2 , 4 , 6 , 7 , 10

- [b]** If  $\frac{x-3y}{x+2y} = \frac{2}{3}$ , then find the value of :  $\frac{x}{y}$

4 [a] From the opposite figure , find :

1 X and Y

2  $X \times (X \cap Y)$



[b] Find the middle proportional of the two quantities :  $2a^2$  ,  $8b^2$

5 [a] Graph the curve of the function  $f : f(x) = 4 - x^2$  , where  $x \in [-2, 2]$  and from the graph find :

1 The coordinates of the vertex of the curve.

2 The maximum or minimum value of the function.

[b] If  $\frac{x}{a+b-c} = \frac{y}{a-b+c} = \frac{z}{b-a+c}$  , prove that :  $\frac{x+y}{a} = \frac{y+z}{c}$

2

Giza Governorate



Answer the following questions :

1 Choose the correct answer :

1 If  $3^{x+1} = 81$  , then  $2x = \dots\dots\dots$

(a) 4

(b) 6

(c) 7

(d) 3

2 If  $n(X) = 2$  ,  $n(X \times Y) = 6$  , then  $n(Y^2) = \dots\dots\dots$

(a) 4

(b) 9

(c) 16

(d) 12

3 If  $x^2 = 4$  , then  $|x| = \dots\dots\dots$

(a)  $\pm 2$

(b) 2

(c) -2

(d) 4

4 If  $xy = 7$  , then  $y \propto \dots\dots\dots$

(a)  $\frac{1}{x}$

(b)  $x-7$

(c)  $x$

(d)  $x+7$

5 If  $x-y = 5$  , then  $6x-6y = \dots\dots\dots$

(a) 30

(b) 11

(c) 1

(d) -1

6 The commonest measure of dispersion and the most accurate is the  $\dots\dots\dots$

(a) arithmetic mean.

(b) median.

(c) standard deviation.

(d) mode.

2 [a] If  $X = \{-1, 0, 1, 2, 3\}$  ,  $Y = \{0, 1, 4, 6, 9\}$  and R is a relation from X to Y where "aRb" means " $a^2 = b$ " for each  $a \in X$  and  $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Prove that R is a function from X to Y and find the range of it.

[b] If a , b , c and d are proportional quantities , prove that :  $\frac{ac}{db} = \left(\frac{a-c}{b-d}\right)^2$



- 3 [a]** If  $y \propto X$  and  $y = 14$ , when  $X = 42$   
**, find :** **[1]** The relation between  $X$  and  $y$   
**[2]** The value of  $y$  when  $X = 60$
- [b]** Graph the curve of the function  $f : f(X) = 4 - X^2$ , where  $X \in [-3, 3]$   
 , from the graph find the vertex of the curve , the maximum value of the function and the equation of the symmetry axis.
- 
- 4 [a]** If  $f(X) = X - 6$  ,  $\frac{1}{3} f(a) = -2$  , **find the value of : a**
- [b]** If  $5a = 3b$  , **find the value of :**  $\frac{7a + 9b}{4a + 2b}$
- 
- 5 [a]** If  $(X - 1, 11) = (8, y + 3)$  , **find the value of :**  $\sqrt{X + 2y}$
- [b]** **Find the standard deviation of the values :** 16 , 32 , 56 , 20 , 27

**3**

**Alexandria Governorate**



*Answer the following questions : (Calculator is allowed)*

- 1 Choose the correct answer from those given :**
- [1]**  $\sqrt[3]{125} = \sqrt{\dots\dots\dots}$   
 (a) 25 (b) 35 (c) 10 (d) 15
- [2]** The ..... is the square root of the mean of the squares of the deviations of the values from their mean.  
 (a) mode (b) median  
 (c) standard deviation (d) mean
- [3]** If  $(2, y^3 + 1) = (2, 65)$  , then  $y = \dots\dots\dots$   
 (a) 6 (b) -8 (c) 8 (d) 4
- [4]** If  $a, b, c$  and  $d$  are in continued proportion , and  $a + b + c = 5$  ,  $b + c + d = 7$   
 , then  $\frac{a}{b} = \dots\dots\dots$   
 (a)  $\frac{5}{7}$  (b)  $\frac{7}{5}$  (c)  $-\frac{5}{7}$  (d)  $-\frac{7}{5}$
- [5]** The solution set of the equation  $4X^2 = 9$  in  $\mathbb{R}$  is .....  
 (a)  $\left\{\frac{3}{2}\right\}$  (b)  $\left\{\frac{3}{2}, -\frac{3}{2}\right\}$  (c)  $\{2.5\}$  (d)  $\{7\}$
- [6]** If  $3^{n+1} = \frac{1}{81}$  , then  $n = \dots\dots\dots$   
 (a) -4 (b) -5 (c) -3 (d) 3

- 2 [a]** If  $X = \{1, 2, 3\}$  ,  $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a$  is the multiplicative inverse of  $b$ " for each  $a \in X$  ,  $b \in Y$  , write  $R$  and represent it by an arrow diagram. Is  $R$  a function ? And why ?

- [b]** Represent graphically the function  $f$  where  $f(x) = 4 - x^2$  ,  $x \in \mathbb{R}$  , consider  $x \in [-3, 3]$  and from the graph deduce the coordinates of the vertex of the curve , the maximum value of the function and the equation of the symmetry axis.

- 3 [a]** If  $X = \{3, 4\}$  ,  $Y = \{4, 5\}$  ,  $Z = \{5, 6\}$  , find :

**[1]**  $X \times Y$

**[2]**  $X \times (Y \cap Z)$

- [b]** If  $f(x) = x^2 - x + 3$  , find :  $f(0)$  ,  $f(-2)$  ,  $f(\sqrt{3})$

- 4 [a]** If  $5a = 3b$  , find the value of :  $\frac{7a+9b}{4a+2b}$

- [b]** If  $\frac{x}{2a+b} = \frac{y}{2b-c} = \frac{z}{2c-a}$  , prove that :  $\frac{2x+y}{4a+4b-c} = \frac{2x+2y+z}{3a+6b}$

- 5 [a]** If  $y \propto \frac{1}{x}$  and  $y = 3$  when  $x = 2$

, find : **[1]** The relation between  $x$  ,  $y$

**[2]** The value of  $y$  when  $x = 1.5$

- [b]** The following frequency distribution shows the number of children of 100 families in a city :

Number of children	0	1	2	3	4	5	Total
Number of families	3	16	17	25	20	19	100

Calculate the mean and the standard deviation.

#### 4 El-Kalyoubia Governorate



Answer the following questions :

- 1** Choose the correct answer from the given ones :

**[1]**  $\sqrt{(-8)^2 + (-6)^2} = \dots\dots\dots$

(a) -14

(b) -10

(c) 10

(d) 14

- [2]** If 18 is the greatest value of a set of individuals and the range = 6 , then the smallest value is .....

(a) 8

(b) 12

(c) 14

(d) 36

- [3]** The relation which represents direct variation between  $x$  and  $y$  is .....

(a)  $xy = 7$

(b)  $y = 4 - x$

(c)  $\frac{x}{2} = \frac{y}{3}$

(d)  $\frac{x}{4} = \frac{5}{y}$



- 4 If  $n(X \times Y) = 6$  and  $Y = \{2\}$ , then  $n(X^2) = \dots\dots\dots$   
 (a) 4 (b) 9 (c) 16 (d) 36

- 5 If  $f(x) = 5$ , then  $f(-5) = \dots\dots\dots$   
 (a) -5 (b) -10 (c) 25 (d) 5

- 6 If  $\frac{x}{5} = \frac{y}{4} = \frac{x+2y}{k}$ , then  $k = \dots\dots\dots$   
 (a) 5 (b) 9 (c) 13 (d) 18

- 2 [a] If  $a, 2, 4$  and  $b$  are in continued proportion, find the value of each of :  $a$  and  $b$

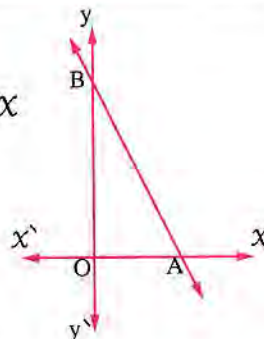
- [b] If  $X = \{2, 3, 5\}$ ,  $Y = \{2, 4, 6, 8\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $b = 2a$ " for each  $a \in X, b \in Y$ , write  $R$  and represent it by an arrow diagram and show if  $R$  is a function from  $X$  to  $Y$  or not.

- 3 [a] If  $\frac{a}{b} = \frac{2}{3}$ , find the value of :  $\frac{3a-b}{2a+b}$

- [b] The opposite figure represents the function  $f$  where  $f(x) = 4 - 2x$

Find : 1 The coordinates of each of  $A$  and  $B$

2 The area of the triangle  $AOB$



- 4 [a] If  $a, b, c, d$  are proportional quantities, prove that :  $\frac{a+2c}{b+2d} = \frac{a-c}{b-d}$

- [b] If  $y \propto x$  and  $y = 14$  when  $x = 42$

find : 1 The relation between  $y$  and  $x$  2 The value of  $y$  when  $x = 60$

- 5 [a] Represent graphically the curve of the function  $f : f(x) = 2 - x^2$  where  $x \in [-2, 2]$  and from the graph deduce the equation of the axis of symmetry and the maximum value of the function.

- [b] Calculate the standard deviation for the following values :  
 16, 32, 5, 20, 27

5

El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 If  $(125, \sqrt{y}) = (x^3, 4)$ , then  $x + y = \dots\dots\dots$

(a) 15 (b) 21 (c) 7 (d) 10



2 If  $2a + 3b = \text{zero}$ , then  $\frac{a}{b} = \dots\dots\dots$

(a)  $\frac{-3}{2}$

(b)  $\frac{-2}{3}$

(c)  $\frac{3}{2}$

(d)  $\frac{2}{3}$

3 If  $3^{X+1} = 12$ , then  $3^X = \dots\dots\dots$

(a) 3

(b) 2

(c) 5

(d) 4

4 If the range of the values 7, a, 8, 9, 5 is 7, then a =  $\dots\dots\dots$

(a) 1

(b) 2

(c) 3

(d) 4

5 If  $\frac{X}{3} = \frac{5}{y}$ , then  $X \propto \dots\dots\dots$

(a)  $y^2$

(b) y

(c)  $\frac{1}{y}$

(d) 5y

6 If the point (X, y) lies on the second quadrant, then the point  $(-X, y^2)$  lies on the  $\dots\dots\dots$  quadrant.

(a) first

(b) second

(c) third

(d) fourth

2 [a] If  $X = \{-2, -1, 0, 2\}$ ,  $Y = \{-3, 1, 5, 2\}$  and R is a relation from X to Y where "aRb" means " $b = a^2 + 1$ " for each  $a \in X$  and  $b \in Y$ , write R, represent it by an arrow diagram, then show if R is a function or not, why? and if R is a function find its range.

[b] If  $\frac{2X+3}{y+2} = \frac{3}{2}$ , find : The ratio of  $\frac{X}{y}$ , and the numerical value of  $\frac{X+2y}{3y}$

3 [a] If  $X = \{3, 4\}$ ,  $Y = \{4, 5\}$ ,  $Z = \{3, 5\}$

, find : 1  $(X - Z) \times Y$

2  $n[(Z \cap Y) \times X]$

[b] Find the positive number which if its square is added to the first term of the ratio 29 : 46 and subtracted from the second term of the ratio, we will get the ratio  $\frac{3}{2}$

4 [a] If 4, a,  $\frac{1}{9b^2}$  are in continued proportion, find : the values of a b

[b] Calculate the arithmetic mean and the standard deviation for the values : 3, 6, 7, 11, 13

5 [a] If  $y \propto X$  and  $y = 8$  when  $X = 4$

, find : 1 The relation between X, y

2 The value of X when  $y = \frac{1}{2}$

[b] Represent the curve of the function  $f : f(X) = -X^2 - 2X$  where  $X \in [-4, 2]$

From the graph, deduce :

1 The coordinates of the vertex of the curve.

2 The equation of the line of symmetry.

3 The maximum value or the minimum value of the function.



Answer the following questions : (Calculator is allowed)

**1 Choose the correct answer from those given :**

**1** If  $(X - 1)$  is the multiplicative inverse of the number  $\frac{1}{3}$ , then  $X = \dots\dots\dots$

- (a)  $\frac{2}{3}$  (b)  $1\frac{1}{3}$  (c) 3 (d) 4

**2** If  $(a + b)^2 = 49$ ,  $a b = 7$ , then  $a^2 + b^2 = \dots\dots\dots$

- (a) 7 (b) 14 (c) 35 (d) 42

**3** The number whose half and one-third are prime numbers is  $\dots\dots\dots$

- (a) 3 (b) 6 (c) 12 (d) 18

**4** If  $\sum (X - \bar{X})^2 = 36$  of a set of values and the number of these values = 9, then  $\sigma = \dots\dots\dots$

- (a) 2 (b) 4 (c) 18 (d) 27

**5** If  $f(X + 2) = X - 2$ , then  $f(5) = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 7

**6** If  $3a = \frac{5}{6}b$ , then  $\frac{a}{b} = \dots\dots\dots$

- (a)  $\frac{18}{5}$  (b)  $\frac{15}{6}$  (c)  $\frac{6}{15}$  (d)  $\frac{5}{18}$

**2 [a]** If  $X = \{1, 2\}$ ,  $Y = \{1, 4\}$ ,  $Z = \{2, 4, 5\}$

, find : **1**  $X \times Y$  **2**  $(Y \cap Z) \times X$  **3**  $n(Z^2)$

**[b]** Two integer numbers, the ratio between them is 3 : 7 and if we subtracted 5 from each term, the ratio between them becomes 1 : 3, find the two numbers.

**3 [a]** If  $X = \{-1, 0, 1, 2, 3\}$ ,  $Y = \{0, 1, 4, 6, 9\}$  and R is a relation from X to Y where " $aRb$ " means " $a^2 = b$ " for all  $a \in X$ ,  $b \in Y$ , write R and represent it by an arrow diagram. Show that R is a function from X to Y and find its range.

**[b]** If a, b, c and d are proportional quantities, prove that :  $\frac{a}{b} \cdot \frac{c}{d} = \left(\frac{a-c}{b-d}\right)^2$

**4 [a]** If y varies inversely as X, and  $y = 3$  when  $X = 2$

, find : **1** The relation between y and X **2** The value of y when  $X = 1.5$

**[b]** If  $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - 2b + 5c}{3X}$ , find : the value of X



- 5 [a] Represent graphically the function  $f : f(X) = (X - 3)^2$ , taking  $X \in [0, 6]$  and from the graph, find :

[1] The equation of the symmetry axis.

[2] The minimum value of the function.

- [b] The following frequency distribution shows the number of the defective units found in 100 boxes of manufactured units :

Number of defective units (X)	zero	1	2	3	4	Total
Number of boxes (k)	8	16	50	20	6	100

Find the standard deviation of the defective units.

7

El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

- 1 [a] Choose the correct answer :

[1] 30 % of 600 = .....

(a) 1.8

(b) 18

(c) 180

(d) 1800

[2] If  $(X + 1, 2) = (5, y - 3)$ , then  $\sqrt{X + y} = \dots\dots\dots$

(a) 2

(b) 3

(c) 6

(d) 9

[3] If X, Y are two sets where  $n(X \times Y) = 11$ , then  $n(X) + n(Y) = \dots\dots\dots$

(a) 8

(b) 9

(c) 11

(d) 12

[b] If a, b, c, d are in continued proportion, prove that :  $\frac{c^2 - d^2}{a - c} = \frac{b \cdot d}{a}$

- 2 [a] Choose the correct answer :

[1] The range of the values :  $X + 4$ ,  $X - 3$ ,  $X + 8$ , where X is a real number is .....

(a) 1

(b) 4

(c) 7

(d) 11

[2] If a, 5, b, 7 are proportional quantities, then  $\frac{a}{b} = \dots\dots\dots$

(a)  $\frac{5}{7}$

(b)  $\frac{7}{5}$

(c) 5

(d) 7

[3] If the real length is 6 m., the length in drawing is 6 cm., then the drawing scale is .....

(a) 1 : 1

(b) 1 : 10

(c) 1 : 100

(d) 1 : 1000

[b] If  $X \times Y = \{(3, 2), (1, 2), (2, 4), (3, 4), (1, 4), (2, 2)\}$

, find : [1]  $X \cup Y$

[2]  $(X - Y) \times (X \cap Y)$



- 3 [a]** If  $X = \{1, 3, 4, 5\}$ ,  $Y = \{1, 2, 3, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a + b = 7$ " for each  $a \in X, b \in Y$

**[1]** Write  $R$  and represent it with an arrow diagram.

**[2]** Show if  $R$  is a function or not, and why? If it is a function, find its range.

- [b]** If  $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{2}{3}$ , and  $5a - 3c + e = 18$ , **find the value of:**  $5b - 3d + f$

- 4 [a]** If  $f : f(x) = kx^2 + (3k + 2)x + 6$  and the  $x$ -coordinate of the vertex of the curve is  $-2$ , **find:** **[1]** The value of  $k$  **[2]** The minimum or maximum value of the function  $f$

- [b]** The number of hours ( $n$ ) needed for carrying out a work varies inversely as the number of workers ( $x$ ) who carry out this work. If the work is carried out by 6 workers within 4 hours, what is the needed time for carrying out the work by 8 workers?

- 5 [a]** Calculate the standard deviation of the values: 12, 13, 16, 18, 21

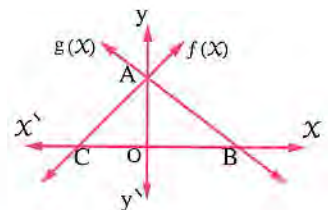
- [b]** In the opposite figure:

$\overrightarrow{AC}$  represents the linear function  $f : f(x) = x + 3$

$\overrightarrow{AB}$  represents the linear function  $g : g(x) = mx + k$

If the length of  $\overline{BC} = 7$  length units, **find:**

- [1]** The value of each of  $k, m$  **[2]**  $g(8)$



**8**

### Port Said Governorate Model (1)



**Answer the following questions:**

- 1** Choose the correct answer from those given:

**[1]**  $\sqrt{50} - \sqrt{8} = \dots\dots\dots$

(a)  $\sqrt{42}$

(b)  $\sqrt{58}$

(c)  $3\sqrt{2}$

(d)  $2\sqrt{5}$

**[2]** If  $X = \{2\}$ , then  $X^2 = \dots\dots\dots$

(a) 4

(b)  $\{4\}$

(c) (2, 2)

(d)  $\{(2, 2)\}$

**[3]**  $f : f(x) = x^4 - 2x^3 + 7$  is a polynomial function of the ..... degree.

(a) first

(b) second

(c) third

(d) fourth

**[4]** If 3, 6 and  $x$  are proportional quantities, then  $x = \dots\dots\dots$

(a) 9

(b) 12

(c) 15

(d) 18

- 5 The range of the set of values 7, 3, 6, 9, 5 is .....
- (a) 3 (b) 4 (c) 6 (d) 12
- 6 If  $\frac{x}{5} = \frac{y}{4} = \frac{x+2y}{k}$ , then  $k =$  .....
- (a) 8 (b) 9 (c) 13 (d) 14
- 7 The relation which represent direct variation between  $y$  and  $x$  is .....
- (a)  $xy = 5$  (b)  $y = x^2 + 3$  (c)  $\frac{x}{3} = \frac{4}{y}$  (d)  $\frac{x}{5} = \frac{y}{3}$
- 8 If  $(1, 2) \in \{(1, x), (3, 4)\}$ , then  $x =$  .....
- (a) 1 (b) 2 (c) 3 (d) 4
- 9  $f(x) = 5$  is represented by a straight line that is parallel to  $x$ -axis and passes through the point .....
- (a)  $(0, 5)$  (b)  $(5, 0)$  (c)  $(5, -5)$  (d)  $(0, 0)$
- 10 If  $y \propto x$  and  $x = 1$  when  $y = 4$ , then the variation constant = .....
- (a) 4 (b) 3 (c) 2 (d) 1
- 11 If  $\frac{a}{b} = \frac{2}{3}$ , then  $3a - 2b =$  .....
- (a) 3 (b) 2 (c) 1 (d) zero
- 12 If  $xy = 5$ , then  $y$  varies inversely as .....
- (a)  $x$  (b)  $\frac{1}{x}$  (c)  $\frac{5}{x}$  (d)  $5 + x$
- 13 If  $\frac{a}{b} = \frac{b}{c} = 2$ , then  $\frac{a}{c} =$  .....
- (a) 2 (b) 4 (c) 6 (d) 8
- 14 The S.S. of the equation:  $x^2 + 9 = 0$  where  $x \in \mathbb{R}$  is .....
- (a)  $\{-3\}$  (b)  $\{3\}$  (c)  $\{-3, 3\}$  (d)  $\emptyset$
- 15 If  $X \times Y = \{(1, 2), (3, 2)\}$ , then  $Y =$  .....
- (a)  $\{1, 2\}$  (b)  $\{3, 2\}$  (c)  $\{2\}$  (d)  $\{1, 3\}$
- 16 If  $f(x) = x + b$ ,  $f(3) = 7$ , then  $b =$  .....
- (a) 10 (b) 7 (c) 4 (d) 3
- 17 If  $y \propto x$ ,  $y \propto \frac{1}{z}$ , then  $y \propto$  .....
- (a)  $\frac{x}{z}$  (b)  $\frac{z}{x}$  (c)  $xz$  (d)  $x + z$
- 18 The point  $(-2, -3)$  lies on the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- 19 If  $n(X) = 3$ ,  $n(X \times Y) = 6$ , then  $n(Y) =$  .....
- (a) 2 (b) 3 (c) 6 (d) 9



20 If  $\frac{a}{b} = \frac{c}{d} = \frac{3}{5}$ , then  $\frac{a+c}{b+d} = \dots\dots\dots$

(a)  $\frac{5}{3}$

(b)  $\frac{3}{5}$

(c)  $\frac{6}{5}$

(d)  $\frac{5}{6}$

21 If  $a, b, 2, 3$  are proportional quantities, then  $\frac{b}{a} = \dots\dots\dots$

(a)  $\frac{3}{2}$

(b)  $\frac{2}{3}$

(c)  $\frac{1}{3}$

(d)  $\frac{1}{2}$

2 Draw the curve of the function  $f : f(x) = x^2 - 1$  where  $x \in [-2, 2]$

and from the graph, find : 1 The minimum value of the function.

2 The equation of the symmetry axis of the curve.

3 If  $y \propto \frac{1}{x}$  and  $y = 3$  when  $x = 4$ , find the value of  $y$  when  $x = 6$

4 Calculate the standard deviation of the values : 1, 3, 5, 7, 9

## 9 Kafr El-Sheikh Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

1 The point  $(-3, -4)$  lies on the ..... quadrant.

(a) first

(b) second

(c) third

(d) fourth

2 If  $2^{x-1} = 8$ , then  $x = \dots\dots\dots$

(a) 2

(b) 3

(c) 4

(d) 5

3 One of the measures of the dispersion is .....

(a) the mean.

(b) the median.

(c) the mode.

(d) the standard deviation.

4 If  $x = 3$ ,  $y = 4$ , then  $\sqrt{x^2 + y^2} = \dots\dots\dots$

(a) 5

(b) -5

(c) 7

(d) -7

5 If  $xy = 7$ , then  $y \propto \dots\dots\dots$

(a)  $x$

(b)  $\frac{1}{x}$

(c)  $7x$

(d)  $\frac{x}{7}$

6  $\frac{1}{3}$  of the number  $3^{12} = \dots\dots\dots$

(a) 1

(b)  $3^4$

(c)  $3^{11}$

(d)  $3^{13}$



- 2 [a]** If  $X = \{2, 3, 4\}$  and  $Y = \{3, 4, 5, 6, 8\}$ ,  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a = \frac{1}{2}b$ " for each  $a \in X, b \in Y$

**[1]** Write  $R$  and represent it by an arrow diagram.

**[2]** Prove that  $R$  is a function, mention its range.

- [b]** If  $\frac{x}{y} = \frac{2}{3}$ , find the value of :  $\frac{6y - x}{3x + 2y}$

- 3 [a]** If  $a, b, c, d$  are proportional quantities, prove that :  $\frac{a + 2c}{b + 2d} = \frac{3a + c}{3b + d}$

- [b]** If  $f(x) = 2x + b$  and  $f(3) = 10$ , find the value of  $b$ , then find  $f\left(\frac{1}{2}\right)$

- 4 [a]** If  $y \propto x$  and  $y = 8$  when  $x = 4$

, find : **[1]** The relation between  $x$  and  $y$

**[2]** The value of  $y$  when  $x = 7$

- [b]** If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

- 5 [a]** Represent graphically the function  $f : f(x) = (x + 1)^2, x \in [-4, 2]$  and from the graph deduce :

**[1]** The coordinates of the vertex of the curve.

**[2]** The minimum value of the function.

- [b]** Calculate the standard deviation of the set of values : 3, 6, 7, 9 and 15

**10**

**Beni Suef Governorate**



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :**

- [1]** If  $3^m = \frac{1}{27}$ , then  $m = \dots\dots\dots$

(a) -1

(b) -2

(c) -3

(d) -4

- [2]** If the point  $(a + 1, a - 2)$  lies in the first quadrant, then  $a \dots\dots\dots 2$

(a) =

(b)  $\leq$

(c)  $<$

(d)  $>$

- [3]**  $\{2\} \subset \dots\dots\dots$

(a)  $\{2, 5\}$

(b)  $[2, 5]$

(c)  $(2, 5)$

(d)  $\{52\}$

- [4]** If 5 is the smallest value of a set of individuals and the range equals 7, then the greatest value of this set is  $\dots\dots\dots$

(a) 7

(b) 10

(c) 12

(d) 14

5 If  $a + b = a b = 5$  , then  $a^2 b + a b^2 = \dots\dots\dots$

(a) 30

(b) 25

(c) 15

(d) 10

6 If  $\frac{a}{b} = \frac{b}{c} = \frac{c}{3} = 2$  , then  $a = \dots\dots\dots$

(a) 54

(b) 24

(c) 18

(d) 6

2 [a] If  $X = \{2\}$  ,  $Y = \{1, 2, 3, 4\}$  ,  $Z = \{3, 4, 5\}$

, find : 1  $n(Z^2)$

2  $X^2$

3  $(Y \cap Z) \times X$

[b] If  $a, b, c$  and  $d$  are proportional quantities , prove that :  $\frac{a+b}{b} = \frac{c+d}{d}$

3 [a] If  $X = \{2, 3, 4\}$  and  $R$  is a relation on  $X$  where " $aRb$ " means " $a - b = \text{zero}$ " for each  $a \in X, b \in X$  , write  $R$  and represent it by an arrow diagram , and if the relation is a function state its range.

[b] If  $\frac{X+2y}{3X-2y} = \frac{3}{2}$  , then find the value of :  $X : y$

4 [a] If  $\frac{a+b}{5} = \frac{b+c}{3} = \frac{c+a}{6}$  , prove that :  $\frac{a+b+c}{a} = \frac{7}{4}$

[b] Calculate the arithmetic mean and the standard deviation of the following data :  
3 , 6 , 7 , 9 and 15

5 [a] If the increase in the sea water level ( $y$ ) is directly proportional with the increase in the Earth's temperature ( $X$ ) , if the Earth's temperature rises by one degree celsius the sea water level increases by 1.4 metre , find the relation between  $y$  and  $X$  , then find the expected increase in the sea water level if the Earth's temperature increased by 2.5 degree celsius.

[b] Represent graphically the function  $f$  where  $f(X) = X^2 + 2X + 1$  , taking  $X \in [-3, 1]$  and from the graph deduce :

1 The equation of the axis of symmetry.

2 The minimum value of the function.

11

Assiut Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

1 The range of the set of the values 4 , 5 , 7 , 10 and 12 is .....

(a) 2

(b) 5

(c) 7

(d) 8



2  $[7, 10] - \{7, 10\} = \dots\dots\dots$

- (a)  $[7, 10[$  (b)  $]7, 10]$  (c)  $]7, 10[$  (d)  $[7, 10]$

3 If the point  $(X - 4, 2 - X)$  where  $X \in \mathbb{Z}$  is located in the third quadrant, then  $X = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 6

4 If  $5^X = 1$ , then  $2^{X+2} = \dots\dots\dots$

- (a)  $\frac{1}{4}$  (b) 4 (c) 8 (d) 10

5 If  $y$  varies directly with  $X$ , and  $X = 3$  when  $y = 2$ , then the constant proportional =  $\dots\dots\dots$

- (a)  $\frac{2}{3}$  (b) 2 (c) 3 (d) 6

6 If  $\frac{7}{3} \times X = \frac{14}{3}$ , then  $X = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 4

2 [a] If  $X = \{2, 5, 6\}$ ,  $Y = \{2, 3\}$

, find : 1  $n(X \times Y)$  2  $Y \times X$  3  $(X \cap Y) \times Y$

[b] If  $\frac{X-2y}{2X+y} = \frac{1}{3}$ , find in the simplest form :  $\frac{X}{y}$

3 [a] If  $X = \{1, 4, 7\}$ ,  $Y = \{1, 3, 4, 6\}$ , and  $R$  is a relation from  $X$  to  $Y$

where " $aRb$ " means " $a = b$ " for each  $a \in X, b \in Y$

1 Write  $R$ , and represent it by an arrow diagram.

2 Is  $R$  a function or not? Mention the reason.

[b] If  $y \propto \frac{1}{X}$  and  $y = 4$  when  $X = 2$

, find : 1 The relation between  $y, X$  2 The value of  $y$  when  $X = 8$

4 [a] Represent graphically the function  $f : f(X) = X^2$ , consider  $X \in [-2, 2]$

, from the graph deduce :

1 The point of the vertex of the curve.

2 The maximum value or the minimum value of the function.

3 The equation of the axis of symmetry.

[b] If  $a, b, c$  and  $d$  are proportional quantities, prove that :  $\frac{a+b}{b} = \frac{c+d}{d}$



5 [a] If  $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a-b+5c}{3x}$ , then find : the value of  $x$

[b] Find the arithmetic mean and the standard deviation of the set of the values :  
12 , 13 , 16 , 18 and 21

12

Qena Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

[1] If  $X = \{1, 2\}$  ,  $Y = \{3, 4\}$  , then  $(3, 4) \in \dots\dots\dots$

(a)  $X \times Y$  (b)  $Y \times X$  (c)  $X^2$  (d)  $Y^2$

[2] If  $\sqrt[3]{27} = \sqrt{x}$  , then  $x = \dots\dots\dots$

(a) 9 (b) -9 (c) 3 (d) -3

[3] If  $a, x, b, 2x$  are proportional , then  $\frac{a}{b} = \dots\dots\dots$

(a) 2 (b)  $\frac{1}{2}$  (c)  $\frac{1}{3}$  (d)  $\frac{1}{4}$

[4] If  $\{2, 7\} = \{x+3, 2\}$  , then  $x = \dots\dots\dots$

(a) 2 (b) 3 (c) 4 (d) 7

[5] The range of the set of values : 23 , 22 , 15 , 18 , 17 is  $\dots\dots\dots$

(a) 8 (b) 18 (c) 19 (d) 23

[6] 20 % of 500 L.E. =  $\dots\dots\dots$  L.E.

(a) 20 (b) 120 (c) 200 (d) 100

2 [a] If  $X = \{-2, -1, 0, 1, 2\}$  and  $R$  is a relation on  $X$  where " $aRb$ " means " $a + b = \text{zero}$ " for each  $a \in X, b \in X$  , write  $R$  and represent it by an arrow diagram , and show that  $R$  is a function , write its range.

[b] If  $\frac{x}{y} = \frac{2}{5}$  , find the value of :  $\frac{3x-y}{2y-3x}$

3 [a] If the function  $f : f(x) = ax^2 + 5x + 4$  is a linear function  
 , find : [1] The value of  $a$  [2]  $f(-2)$

[b] If  $b$  is the middle proportional between  $a$  and  $c$  , prove that :  $\sqrt{\frac{a^2 + b^2}{b^2 + c^2}} = \frac{a}{b}$   
 , where  $a, b$  and  $c$  are positive numbers.

4 [a] If  $a, b, c, d$  are proportional quantities , prove that :  $\frac{a+2c}{b+2d} = \frac{3a+c}{3b+d}$

[b] Represent graphically the curve of the function  $f$  where  $f(x) = (x-2)^2$  on the interval  $[-1, 5]$ , from the graph find :

- [1] The point of the vertex of the curve.
- [2] The equation of the line of symmetry.
- [3] The maximum or minimum value.

5 [a] If  $y \propto x$ , and  $y = 12$  when  $x = 4$

- , find :
- [1] The relation between  $x$  and  $y$ .
  - [2] The value of  $x$  when  $y = 36$

[b] The following frequency distribution shows the number of days of the students absentees in a class :

Number of absence days ( $x$ )	0	1	2	3	4	Total
Number of students (frequency)	5	7	7	5	6	30

Calculate the mean and the standard deviation.

13

Aswan Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from those given :

[1] If  $\left(\frac{1}{2}\right)^x = 8$ , then  $x = \dots\dots\dots$

- (a)  $\frac{1}{2}$  (b) 2 (c) -3 (d) 3

[2] If  $(x, y-3) = (3, 1)$ , then  $\sqrt{x^2 + y^2} = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 5

[3] The range of the values : 3, 5, 7, 9 is  $\dots\dots\dots$

- (a) 6 (b) 7 (c) 8 (d) 9

[4] The middle proportional between 4 and 9 equals  $\dots\dots\dots$

- (a) 6 (b) -6 (c)  $\pm 6$  (d) 13

[5] If  $a-b=5$ ,  $a+b=3$ , then  $a^2-b^2 = \dots\dots\dots$

- (a) 15 (b) 8 (c) 2 (d) 1

[6] If  $X = \{2\}$ ,  $Y = \{3\}$ , then  $n(X \times Y) = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 6



**2 [a]** If  $X = \{2, 3, 4\}$ ,  $Y = \{2, 4, 6, 9, 16\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a^2 = b$ " for all  $a \in X$ ,  $b \in Y$

**[1]** Write  $R$

**[2]** Is  $R$  a function? Find its range.

**[b]** If  $y \propto X$  and  $y = 6$  when  $X = 2$ , find :

**[1]** The relation between  $X$  and  $y$

**[2]** The value of  $y$  when  $X = \frac{1}{3}$

**3 [a]** If  $a, b, c$  and  $d$  are proportional quantities, prove that :  $\frac{a+b}{b} = \frac{c+d}{d}$

**[b]** If  $X = \{1, 2, 3\}$ ,  $Y = \{3, 4\}$ , find :

**[1]**  $(Y \cap X) \times Y$

**[2]**  $n(X^2)$

**4 [a]** Find the positive number which if its square is added to the two terms of the ratio  $1 : 2$ , it becomes  $5 : 6$

**[b]** Represent graphically the curve of the function  $f : f(X) = X^2 + 1$ , taking  $X \in [-2, 2]$  and from the graph deduce :

**[1]** The vertex point of the curve.

**[2]** The equation of the axis of symmetry.

**5 [a]** If  $y$  changes inversely with  $X$  and  $y = 2$  when  $X = 3$ , find :

**[1]** The relation between  $y$  and  $X$

**[2]** The value of  $y$  when  $X = 12$

**[b]** Calculate the arithmetic mean and the standard deviation of the values :  
5, 7, 8, 9, 6

**14**

North Sinai Governorate



Answer the following questions : (Calculator is allowed)

**1** Choose the correct answer from those given :

**[1]** If  $n(X) = 4$ ,  $n(Y) = 5$ , then  $n(X \times Y) = \dots\dots\dots$

(a) 9

(b) 5

(c) 20

(d) 4

**[2]** If  $2^X = 1$ , then  $5^X = \dots\dots\dots$

(a) 32

(b) zero

(c) 10

(d) 5

**[3]** If  $X - y = 3$ ,  $X + y = 7$ , then  $X^2 - y^2 = \dots\dots\dots$

(a) 21

(b) 10

(c) 4

(d) 9

**[4]** If  $Xy = 6$ , then  $y \propto \dots\dots\dots$

(a)  $X$

(b)  $X - 6$

(c)  $\frac{1}{X}$

(d)  $6X$



5 The range of the values : 7 , 11 , 4 , 9 , 16 is .....

- (a) 4 (b) 12 (c) 5 (d) 3

6  $[2, 5] - \{2, 5\} = \dots\dots\dots$

- (a)  $[2, 5]$  (b)  $]2, 5]$  (c)  $]2, 5[$  (d)  $\{2, 5\}$

2 [a] If  $y \propto X$  and  $y = 3$  at  $X = 9$  , find :

1 The relation between  $y$  ,  $X$

2 The value of  $y$  at  $X = 12$

[b] If  $\frac{a}{5} = \frac{b}{2} = \frac{c}{3}$  , prove that :  $\frac{a+b-c}{a-b+c} = \frac{2}{3}$

3 [a] If  $X = \{4, 9, 16\}$  ,  $Y = \{1, 2, 3, 4, 5\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $aRb$ " means " $a = b^2$ " for each  $a \in X$  ,  $b \in Y$

1 Write  $R$  and represent it by an arrow diagram.

2 Show that  $R$  is a function and find its range.

[b] Find the number which if added to each of the two terms of the ratio 3 : 7 , it becomes 1 : 2

4 [a] If  $(X^3 - 1, 4) = (7, y)$  , find the value of :  $4X - y$

[b] Represent graphically the function  $f : f(X) = 2 - X^2$  , consider  $X \in [-3, 3]$  and from the drawing deduce :

1 The vertex of the curve.

2 The maximum value of the function.

3 The equation of the axis of symmetry.

5 [a] If  $b$  is the middle proportional between  $a$  ,  $c$  , prove that :  $\frac{a^2 + b^2}{c^2 + b^2} = \frac{a}{c}$

[b] Calculate the standard deviation of the values : 12 , 13 , 16 , 18 , 21

15

Red Sea Governorate



Answer the following questions :

1 Choose the correct answer from the given answers :

1 If  $n(X) = 2$  ,  $n(Y) = 9$  , then  $n(X \times Y) = \dots\dots\dots$

- (a) 6 (b) 7 (c) 11 (d) 18

2 If  $2^X = \frac{1}{8}$  , then  $X = \dots\dots\dots$

- (a)  $\frac{1}{2}$  (b)  $\frac{1}{3}$  (c) 3 (d) -3

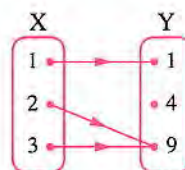
- 3 The middle proportional between 3, 27 is .....  
 (a) 9 (b)  $\pm 9$  (c) 81 (d)  $\pm 81$
- 4 The multiplicative inverse of the number 0.25 is .....  
 (a) 4 (b)  $-4$  (c)  $\frac{1}{4}$  (d)  $-\frac{1}{4}$
- 5 The straight line  $3x + 8y = 24$  intersects y-axis at the point .....  
 (a) (0, 8) (b) (8, 0) (c) (0, 3) (d) (3, 0)
- 6 The range of the values 7, 3, 6, 9, 5 is .....  
 (a) 3 (b) 4 (c) 6 (d) 12

2 [a] If  $y \propto x$  and  $y = 6$  when  $x = 3$ , find :

1 The relation between  $y$  and  $x$

2 The value of  $y$  when  $x = 5$

[b] The opposite arrow diagram represents a relation  $R$  from  $X$  to  $Y$



1 Write  $R$

2 Is  $R$  a function? Why? If it is a function, find its range.

3 [a] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a}{c} = \frac{b^2}{c^2}$

[b] If  $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$ , find :

1  $X$

2  $n(Y^2)$

3  $Y \times X$

4 [a] If  $\frac{x}{y} = \frac{2}{3}$ , find the value of :  $\frac{y+2x}{y-x}$

[b] If  $a, b, c, d$  are proportional quantities, prove that :  $\frac{3a-2c}{3b-2d} = \frac{5a+3c}{5b+3d}$

5 [a] Calculate the mean and the standard deviation of the values : 8, 9, 7, 6, 5

[b] Represent graphically the function  $f : f(x) = x^2 - 4$  where  $x \in [-3, 3]$  and from the graph identify :

1 The minimum value.

2 The equation of the axis of symmetry.

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**1**

**Cairo Governorate**



*Answer the following questions : (Calculator is allowed)*

**1 Choose the correct answer from those given :**

- 1** If  $\sin H = \frac{1}{2}$ , where  $\angle H$  is an acute angle, then  $m(\angle H) = \dots\dots\dots$   
 (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- 2** If  $\triangle ABC \equiv \triangle XYZ$ ,  $m(\angle A) = 40^\circ$ , then  $m(\angle X) = \dots\dots\dots$   
 (a)  $140^\circ$  (b)  $80^\circ$  (c)  $50^\circ$  (d)  $40^\circ$
- 3** The distance between the point  $(7, 4)$  and y-axis equals  $\dots\dots\dots$  length unit.  
 (a)  $-7$  (b)  $-4$  (c)  $4$  (d)  $7$
- 4** If  $L_1, L_2$  are two straight lines in the same plane and  $L_1 \cap L_2 = \emptyset$ , then the two straight lines are  $\dots\dots\dots$   
 (a) intersecting. (b) perpendicular. (c) parallel. (d) coincident.
- 5** If  $m_1, m_2$  are the slopes of two parallel straight lines, then  $\dots\dots\dots$   
 (a)  $m_1 = m_2$  (b)  $m_1 m_2 = -1$  (c)  $m_1 - m_2 = -1$  (d)  $m_1 m_2 = 1$
- 6** The number of altitudes of the isosceles triangle equals  $\dots\dots\dots$   
 (a) zero. (b)  $1$  (c)  $2$  (d)  $3$

**2 [a]** ABC is a right-angled triangle at B, where  $AB = 8$  cm. and  $BC = 6$  cm.

**Prove that :**  $\cos A \cos C = \sin A \sin C$

**[b]** Find the equation of the straight line which passes through the point  $(2, 5)$  and is perpendicular to the straight line whose slope equals  $\frac{-1}{2}$

**3 [a]** If  $\overleftrightarrow{AB}$  is parallel to the X-axis, where  $A(4, 2)$  and  $B(1, k)$ , find the value of  $k$

**[b] Find the value of :**  $\sin 30^\circ + \cos 60^\circ + 2 \sin 45^\circ \cos 45^\circ$  (Write the steps)

**4 [a]** Prove that the triangle whose vertices are  $A(2, 1)$ ,  $B(-2, 1)$  and  $C(0, 4)$  is an isosceles triangle.

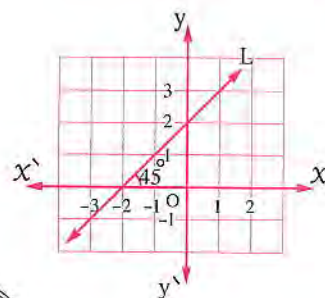
**[b]** If  $\tan(X + 5)^\circ = \sin 60^\circ \cos 30^\circ + \sin^2 30^\circ$ ,  
 find the value of  $X$  where  $(X + 5)^\circ$  is the measure of an acute angle.

**5 [a]** If  $C(3, 4)$  is the midpoint of  $\overline{AB}$  where  $A(1, 2)$ , find the coordinates of the point B



[b] From the opposite figure , find

- 1 The slope of the straight line L
- 2 The length of the y-intercept.
- 3 The equation of the straight line L



2

Giza Governorate



Answer the following questions :

1 Choose the correct answer :

- 1 If  $\tan (X + 10^\circ) = \sqrt{3}$  where  $X$  is the measure of an acute angle , then  $X = \dots\dots\dots$   
 (a)  $60^\circ$  (b)  $50^\circ$  (c)  $20^\circ$  (d)  $45^\circ$
- 2 If  $X + y = 5$  ,  $kX + 2y = 0$  are two perpendicular straight lines , then  $k = \dots\dots\dots$   
 (a)  $-2$  (b)  $-1$  (c)  $1$  (d)  $2$
- 3 If the two adjacent angles are complementary , then the outer sides of them are  $\dots\dots\dots$   
 (a) parallel. (b) including an acute angle.  
 (c) perpendicular. (d) collinear.
- 4 ABCD is a parallelogram ,  $m(\angle A) + m(\angle C) = 200^\circ$  , then  $m(\angle B) = \dots\dots\dots$   
 (a)  $50^\circ$  (b)  $80^\circ$  (c)  $100^\circ$  (d)  $160^\circ$
- 5 The perpendicular distance between the two straight lines  $X - 2 = 0$  and  $X + 3 = 0$  equals  $\dots\dots\dots$  length units.  
 (a) 1 (b) 5 (c) 2 (d) 3
- 6 ABC is a triangle ,  $(AC)^2 > (AB)^2 + (BC)^2$  , then  $\angle A$  is  $\dots\dots\dots$   
 (a) obtuse. (b) right. (c) reflex. (d) acute.

2 [a] If ABCD is a trapezium ,  $\overline{AD} \parallel \overline{BC}$  ,  $m(\angle B) = 90^\circ$  ,  $AB = 3$  cm. ,  $AD = 6$  cm. and  $BC = 10$  cm. , prove that :

$$\cos (\angle DCB) - \tan (\angle ACB) = \frac{1}{2}$$

[b] If the straight line  $L_1$  passes through the two points  $(3, 1)$  ,  $(2, k)$  and the straight line  $L_2$  makes an angle of measure  $45^\circ$  with the positive direction of  $X$ -axis , find the value of  $k$  if  $L_1 \perp L_2$

- 3 [a] Without using the calculator , prove that :**

$$\tan^2 60^\circ - \tan^2 30^\circ = (1 + \tan 60^\circ \tan 30^\circ) \div \cos^2 30^\circ$$

- [b] Find the equation of the straight line which passes through the point (3 , - 5) and is parallel to the straight line  $X + 2 y - 7 = 0$**

- 4 [a] If the point C (6 , - 4) is the midpoint of  $\overline{AB}$  , where A (5 , - 3) , find the point B**

- [b] Find the measure of the angle A where  $\angle A$  is an acute angle if :**

$$\sin A = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

- 5 [a] Prove that the points A (- 1 , 1) , B (0 , 5) , C (4 , 2) and D (5 , 6) are the vertices of a parallelogram.**

- [b] Find the slope and the intercepted part of y-axis by the straight line  $5 X + 4 y - 10 = 0$**

**3**

**Alexandria Governorate**



**Answer the following questions : (Calculators are permitted)**

- 1 Choose the correct answer from those given :**

- [1] The number of axes of symmetry of the isosceles triangle is .....**  
 (a) 3 (b) 2 (c) 1 (d) 0
- [2] If the distance between the two points (a , 7) , (- 2 , 3) equals 5 length unit , then a = .....**  
 (a) - 1 or 5 (b) 10 (c) 1 or - 5 (d) 7
- [3] The sum of measures of the angles of the quadrilateral equals .....**  
 (a)  $180^\circ$  (b)  $360^\circ$  (c)  $540^\circ$  (d)  $720^\circ$
- [4] If the straight lines  $3 X - 4 y - 3 = 0$  ,  $ky + 4 X - 8 = 0$  are perpendicular , then k = .....**  
 (a) - 4 (b) 3 (c) 13 (d) 4
- [5] The area of the rhombus whose diagonals lengths are 10 cm. and 12 cm equals .....  $\text{cm}^2$**   
 (a) 120 (b) 60 (c) 22 (d) 15
- [6] ABCDEF is a regular hexagon ,  $m(\angle BAC) = X^\circ$  , then  $\sin X = \dots\dots\dots$**   
 (a)  $\frac{BC}{AB}$  (b)  $\frac{BC}{AC}$  (c)  $\frac{\sqrt{3}}{2}$  (d)  $\frac{1}{2}$



- 2 [a] If  $X$  is the measure of an acute angle , find the value of  $X$  which satisfies :  
 $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$
- [b] Prove that the straight line which passes through the two points  $(-3, -2)$  ,  $(4, 5)$  is parallel to the straight line which makes an angle of measure  $45^\circ$  with the positive direction of  $X$ -axis.
- 
- 3 [a] ABC is an isosceles triangle in which  $AB = AC = 10$  cm. ,  $BC = 12$  cm.  
 Find : 1  $m(\angle B)$   
 2 The area of the triangle.
- [b] Find the slope and the y-intercept by the straight line  $2X - 3y - 6 = 0$
- 
- 4 [a] Without using calculator , prove that :  
 $\tan^2 60^\circ - \tan^2 45^\circ = \sin^2 60^\circ + \cos^2 60^\circ + 2 \sin 30^\circ$
- [b] Find the equation of the straight line which passes through the point  $(3, -5)$  and is parallel to the straight line  $X + 2y - 7 = 0$
- 
- 5 [a] Prove that the points A  $(-1, 3)$  , B  $(5, 1)$  and C  $(6, 4)$  and D  $(0, 6)$  are the vertices of a rectangle.
- [b] If the point  $(2, 3)$  is the midpoint of  $\overline{AB}$  , where  $A \in X$ -axis ,  $B \in y$ -axis. , find the coordinates of A and B

4

El-Kalyoubia Governorate



Answer the following questions :

- 1 Choose the correct answer from the given ones :
- 1 The number of axes of symmetry of the semicircle equals .....  
 (a) 0 (b) 1 (c) 2 (d) an infinite number.
- 2 The distance between the point  $(-4, 2)$  and y-axis equals ..... length unit.  
 (a) -4 (b) -2 (c) 2 (d) 4
- 3 If  $2 \sin X = \tan X$  where  $X$  is the measure of an acute angle , then  $X =$  .....  
 (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- 4 If  $\overrightarrow{AB} \perp \overrightarrow{CD}$  , and the slope of  $\overrightarrow{AB} = \frac{1}{5}$  , then the slope of  $\overrightarrow{CD} =$  .....  
 (a) -5 (b)  $-\frac{1}{5}$  (c) 5 (d)  $\frac{1}{5}$



- 5 The straight line whose equation is  $2y = 5x + 6$  cuts from the positive part of y-axis a part equals ..... length unit.

(a) 2 (b) 3 (c) 5 (d) 6

- 6  $\sin 30^\circ + \cos 60^\circ = \dots\dots\dots$

(a)  $\frac{1}{4}$  (b) 0 (c) 1 (d)  $\frac{\sqrt{3}}{2}$

- 2 [a] Without using the calculator, prove that :  $2 \sin 30^\circ = \tan^2 60^\circ - 2 \tan 45^\circ$

- [b] Find the equation of the straight line which passes through the point  $(2, -5)$  and its slope is 2

- 3 [a] If C is the midpoint of  $\overline{AB}$  where  $A(-3, y)$ ,  $B(9, 11)$  and  $C(x, -3)$ , find the value of each of  $x$  and  $y$

- [b] Prove that the straight line passing through the two points  $(-1, 3)$ ,  $(2, 4)$  is parallel to the straight line  $x - 3x + 1 = 0$

- 4 [a] If  $2 \cos x - \sqrt{3} = 0$  where  $x$  is the measure of an acute angle, find :  $\tan 2x$

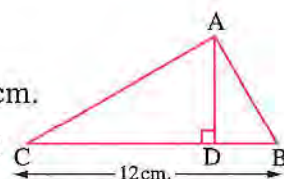
- [b] Prove that the points  $A(-3, -1)$ ,  $B(6, 5)$  and  $C(3, 3)$  are collinear.

- 5 [a] Prove that the points  $A(3, 2)$ ,  $B(4, -3)$ ,  $C(-1, -2)$  and  $D(-2, 3)$  are the vertices of the rhombus ABCD

- [b] In the opposite figure :

ABC is an acute-angled triangle where  $\overline{AD} \perp \overline{BC}$  and  $BC = 12$  cm.

Find by showing the steps the value of :  $AB \cos B + AC \cos C$



5

El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 If the straight line whose equation is  $kx + \sqrt{3}y = 4$  makes an angle of measure  $60^\circ$  with the positive direction of  $x$ -axis, then  $k = \dots\dots\dots$

(a) 3 (b) -3 (c)  $\sqrt{3}$  (d)  $-\sqrt{3}$

- 2 In  $\triangle ABC$ , if  $\sin A = \cos C$ , then  $\triangle ABC$  is .....

(a) an acute-angled triangle. (b) a right-angled triangle.  
(c) an obtuse-angled triangle. (d) an isosceles triangle.

3 The rhombus whose diagonals lengths are 12 cm. , 10 cm. , its area is .....  $\text{cm}^2$

- (a) 120 (b) 60 (c) 22 (d) 16

4 A triangle has only one axis of symmetry and two side lengths of its sides are 4 cm. , 8 cm. , then the length of its third side is ..... cm.

- (a) 5 (b) 12 (c) 4 (d) 8

5 If the two vertically opposite angles are supplementary , then the measure of each one is .....

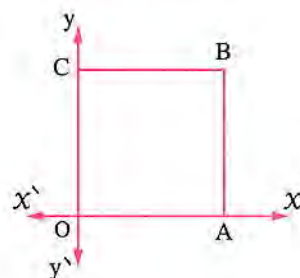
- (a)  $45^\circ$  (b)  $180^\circ$  (c)  $90^\circ$  (d)  $60^\circ$

6 In the opposite figure :

OABC is a square of side length 4 cm.

, then the equation of  $\overleftrightarrow{AC}$  is .....

- (a)  $y = x + 4$  (b)  $y = x - 4$   
(c)  $y = -x + 4$  (d)  $x = 4y + 4$



2 [a] Find the equation of the straight line which passes through the point (3 , -1) and is parallel to the straight line which passes through the two points (-2 , 1) , (1 , 5)

[b] If  $2 \tan X = \tan^2 60^\circ - 2 \sin 30^\circ$  where X is an acute angle , find :  $m(\angle X)$

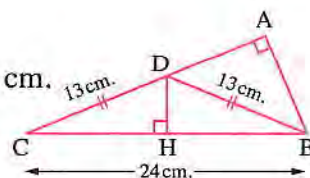
3 [a] If the points A (1 , 4) , B (-1 , -2) and C (2 , -3) are the vertices of a triangle , prove that :  $\triangle ABC$  is right-angled at B , and find its area.

[b] In the opposite figure :

$\triangle ABC$  is right-angled at A ,  $D \in \overline{AC}$  , where  $BD = DC = 13 \text{ cm}$ .

,  $\overline{DH} \perp \overline{BC}$  ,  $BC = 24 \text{ cm}$ .

Find the value of : 1  $\tan(\angle DCB)$  2  $\cos(\angle ABC)$



4 [a] Find the equation of the straight line which passes through the point (10 , 2) and is perpendicular to the straight line whose equation is  $5x - 2y = 17$

[b] ABCD is a parallelogram whose vertices are A (3 , 2) , B (4 , -5) , C (0 , -3)

Find : 1 The coordinates of the intersection point of its diagonals.

2 The coordinates of the point D



**5 [a]** Without using the calculator, find the value of :  $\sin^2 30^\circ - 9 \cos^2 60^\circ + \tan^2 45^\circ$

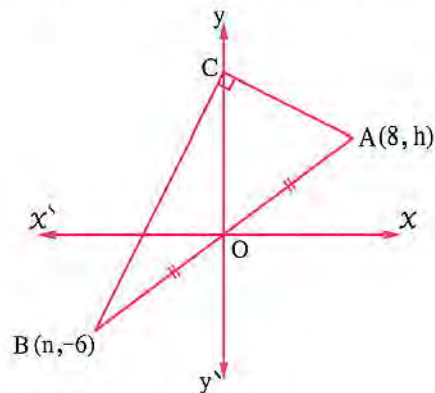
**[b]** In the opposite figure :

$\triangle ABC$  is right-angled at  $C$ ,

where  $A(8, h)$ ,  $B(n, -6)$ ,  $O$  is the midpoint of  $\overline{AB}$

**Find :** **[1]**  $h + n$

**[2]** The equation of  $\overleftrightarrow{AC}$



**6**

**El-Gharbia Governorate**



*Answer the following questions :*

**1** Choose the correct answer from the given ones :

**[1]** If the lengths of two sides of a triangle are 2 cm. and 5 cm. , then the perimeter of the triangle  $\in$  .....

(a)  $]3, 7[$  (b)  $]4, 6[$  (c)  $]10, 14[$  (d)  $]9, 21[$

**[2]** If  $\overline{AB} \equiv \overline{XY}$ , then  $\frac{3AB}{5XY} =$  .....

(a) 1 (b) 0.6 (c) zero (d) 1.7

**[3]** The edge length of a cube is 8 cm. , then its volume is .....  $\text{cm}^3$

(a) 2 (b) 32 (c) 64 (d) 512

**[4]** If  $\sin 30^\circ = \cos \theta$ , where  $\theta$  is the measure of an acute angle, then  $\theta =$  .....

(a)  $15^\circ$  (b)  $30^\circ$  (c)  $60^\circ$  (d)  $90^\circ$

**[5]** If the straight line  $y = kx + 1$  is parallel to the straight line  $2y - x = 5$ , then  $k =$  .....

(a) 1 (b)  $\frac{1}{2}$  (c) 2 (d) -2

**[6]** If the  $x$ -axis bisects  $\overline{AB}$  such that  $A(3, 2)$  and  $B(x, y)$ , then  $y =$  .....

(a) -3 (b) -2 (c) 2 (d) 3

**2 [a]** XYZ is a right-angled triangle at Z,  $XZ = 7$  cm. and  $XY = 25$  cm.

**Find the value of :**  $\tan X \times \tan Y$

**[b]** If  $\overline{AB}$  is a diameter in the circle M, where  $B(8, 11)$ ,  $M(5, 7)$

**, find :** **[1]** The coordinates of the point A

**[2]** The circumference of the circle in terms of  $\pi$



- 3 [a]** If the distance between the point  $(a, 7)$  and the point  $(0, -5)$  equals 13 length units ,  
**find :** the value of  $a$

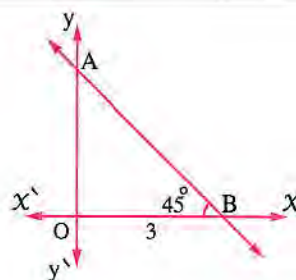
- [b]** Without using the calculator , find the value of  $X$  (where  $X$  is the measure of an acute angle)  
 , if  $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$

- 4 [a]** In the opposite figure :

$\overrightarrow{AB}$  intercepts from the positive part  
 of  $X$ -axis 3 length units

,  $m(\angle ABO) = 45^\circ$

Find the equation of  $\overrightarrow{AB}$



- [b]** Without using the calculator , prove that :

$$\sin^2 60^\circ - \tan 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ = \sin 30^\circ - \sin^2 45^\circ - \cos 60^\circ$$

- 5 [a]** If ABCD is a square where  $A(3, 5)$  ,  $C(5, -1)$  , find the slope of  $\overrightarrow{BD}$

- [b]** Find the equation of the straight line which passes through the point  $(3, -5)$  and is  
 parallel to the straight line  $X + 2y - 7 = 0$

7

Ismailia Governorate



**Answer the following questions : (Calculator is allowed)**

- 1** Choose the correct answer from those given :

- 1** The number of axes of symmetry of the equilateral triangle is .....

(a) zero (b) 1 (c) 2 (d) 3

- 2** If  $2 \cos 2X = 1$  , where  $2X$  is the measure of an acute angle, then  $X = \dots\dots\dots$

(a)  $15^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $60^\circ$

- 3** The angle whose measure is  $50^\circ$  supplements an angle of measure .....

(a)  $40^\circ$  (b)  $90^\circ$  (c)  $130^\circ$  (d)  $180^\circ$

- 4** The distance between the point  $(-2, 3)$  and  $X$ -axis equals ..... length units.

(a) 3 (b) -3 (c) 2 (d) -2

- 5** If the point A lies on the axis of symmetry of  $\overline{XY}$  , then  $\overline{AX} \dots\dots\dots \overline{AY}$

(a) // (b)  $\perp$  (c) = (d)  $\equiv$

- 6** The straight line whose equation is  $2X - 3y = 6$  intercepts from the negative part of  
 $y$ -axis a part of length ..... length units.

(a) -6 (b) -2 (c) 3 (d) 2

- 2 [a]** If  $A = (5, 1)$ ,  $B = (3, -7)$  and  $C = (1, 3)$   
 , prove that the points A , B and C are non-collinear points.

**[b] Without using the calculator , prove that :**

$$\cos 60^\circ + 2 \sin^2 45^\circ = \sin 30^\circ + 3 \tan^2 30^\circ$$

- 3 [a]**  $\Delta ABC$  is a right-angled triangle at B ,  $5 \sin C = 3$

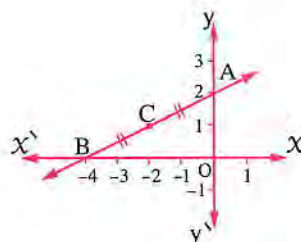
**Find the value of :**  $\cos A \cos C - \sin A \sin C$

**[b] In the opposite figure :**

C is the midpoint of  $\overline{AB}$

**Find :** **[1]** The coordinates of the point C

**[2]** The equation of  $\overrightarrow{CO}$



- 4 [a]** Find the equation of the straight line which passes through the point  $(0, -2)$  and is parallel to the straight line :  $x - 2y = 7$

**[b]** Prove that the straight line which passes through the two points  $(4, 3\sqrt{3})$  and  $(5, 2\sqrt{3})$  is perpendicular to the straight line that makes with the positive direction of the X-axis an angle of measure  $30^\circ$

- 5 [a]** Show the type of  $\Delta ABC$  such that  $A(3, 3)$ ,  $B(1, 5)$  and  $C(1, 3)$  according to its sides lengths.

**[b]** Without using the calculator , find the value of  $x$  if  $\sin x = \tan 30^\circ \sin 60^\circ$   
 where  $x$  is the measure of an acute angle.

**8**

**Suez Governorate**



**Answer the following questions : (Calculator is allowed)**

- 1 Choose the correct answer from those given :**

**[1]**  $\tan 45^\circ \sin 30^\circ = \dots\dots\dots$

- (a) 1                      (b)  $\frac{1}{2}$                       (c)  $\frac{2}{3}$                       (d)  $\frac{1}{4}$

**[2]** If  $\Delta ABC \equiv \Delta XYZ$ , then  $\overline{AB} \dots\dots\dots \overline{XY}$

- (a) <                      (b) =                      (c)  $\equiv$                       (d) >



- 3 If  $\overrightarrow{AB} \parallel \overrightarrow{CD}$  and the slope of  $\overrightarrow{AB} = \frac{2}{3}$ , then the slope of  $\overrightarrow{CD} = \dots\dots\dots$   
 (a)  $\frac{2}{3}$  (b)  $\frac{3}{2}$  (c)  $-\frac{2}{3}$  (d)  $-\frac{3}{2}$
- 4 If  $\triangle ABC$  is right-angled at B,  $AB = BC$ , then  $m(\angle C) = \dots\dots\dots$   
 (a)  $90^\circ$  (b)  $50^\circ$  (c)  $45^\circ$  (d)  $30^\circ$
- 5 The straight line whose equation is  $2x + 3y - 6 = 0$  cuts from the positive part of y-axis a part of length  $\dots\dots\dots$  unit.  
 (a)  $-6$  (b)  $-2$  (c)  $\frac{2}{3}$  (d)  $2$
- 6 If ABCD is a rhombus,  $m(\angle A) + m(\angle C) = 140^\circ$ , then  $m(\angle A) = \dots\dots\dots$   
 (a)  $70^\circ$  (b)  $40^\circ$  (c)  $110^\circ$  (d)  $220^\circ$

- 2 [a] If C is the midpoint of  $\overline{AB}$ , A (2, 4), B (6, 0), find the coordinates of the point C  
 [b] Find the equation of the straight line whose slope equals 2 and passes through the point (2, 3)

- 3 [a] Without using calculator, prove that :  $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$   
 [b] Show the type of  $\triangle ABC$  according to its sides if A (0, 0), B (3, 4) and C (-4, 3)

- 4 [a] If  $3 \tan E = 2 \sin 30^\circ + 4 \cos 60^\circ$ , find :  $m(\angle E)$  (Where E is an acute angle)  
 [b] Find the slope of the straight line which is perpendicular to the straight line passing through the two points (3, -2), (5, 1)

- 5 [a] If ABC is a right-angled triangle at B,  $AB = 3$  cm.,  $BC = 4$  cm., find :  
 1 The length of  $\overline{AC}$  2  $\sin^2 C + \cos^2 C$   
 [b] Prove that the points A (4, 3), B (1, 1) and C (-5, -3) are collinear.

9

Damietta Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1  $\sin 25^\circ = \cos \dots\dots\dots$   
 (a)  $25^\circ$  (b)  $65^\circ$  (c)  $90^\circ$  (d)  $155^\circ$
- 2 The angle whose measure is more than  $90^\circ$  and less than  $180^\circ$  is  $\dots\dots\dots$  angle.  
 (a) an obtuse (b) an acute (c) a right (d) a straight



3 The slope of the straight line parallel to the  $X$ -axis is .....

- (a) undefined (b)  $-1$  (c)  $1$  (d) zero

4 The lengths of two sides of an isosceles triangle equal  $3\text{ cm.}$  ,  $7\text{ cm.}$  , then the length of the third side equals .....  $\text{cm.}$

- (a)  $3$  (b)  $4$  (c)  $7$  (d)  $10$

5 The distance between the point  $(-3, 2)$  and the  $y$ -axis equals ..... length units.

- (a)  $3$  (b)  $2$  (c)  $-2$  (d)  $-3$

6 The number of axes of symmetry of the opposite shape is .....

- (a)  $1$  (b)  $2$   
(c)  $3$  (d)  $4$



2 [a] If  $C(6, -4)$  is the midpoint of  $\overline{AB}$  where  $A(5, -3)$  , then find the point  $B$

[b] Find the equation of the straight line passing through the point  $(3, 4)$  and parallel to the straight line  $X - 2y + 3 = 0$

3 [a] Without using calculator , prove that :  $2 \sin 30^\circ + 4 \cos 60^\circ = \tan^2 60^\circ$

[b] Prove that the points  $A(-2, 0)$  ,  $B(5, 1)$  and  $C(6, -6)$  which belong to an orthogonal cartesian coordinates plane lie on the circle whose centre is  $M(2, -3)$   
Find the circumference of the circle. (where  $\pi = 3.14$ )

4 [a] If  $\cos X \tan 30^\circ = \cos^2 45^\circ$  , find the value of  $X$  , where  $X$  is the measure of an acute angle.

[b] Find the equation of the straight line passing through the two points  $(1, 2)$  ,  $(-1, -2)$  , then prove that it passes through the origin point.

5 [a] Find the slope of the straight line :  $3y - 2x - 6 = 0$  , then find the length of the intercepted part from  $y$ -axis.

[b] In the opposite figure :

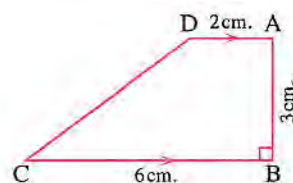
$ABCD$  is a trapezium

,  $\overline{AD} \parallel \overline{BC}$  ,  $m(\angle B) = 90^\circ$

,  $AB = 3\text{ cm.}$  ,  $BC = 6\text{ cm.}$  and  $AD = 2\text{ cm.}$

Find : 1 The length of  $\overline{DC}$

2 The value of  $\cos(\angle BCD)$



10

El-Beheira Governorate



Answer the following questions : (Calculator is permitted)

1 Choose the correct answer from the given ones :

1  $4 \cos 30^\circ \tan 60^\circ = \dots\dots\dots$

(a) 3

(b)  $2\sqrt{3}$

(c) 6

(d) 12

2 The straight line whose equation is  $2x - 3y - 6 = 0$  intersects from the negative part of y-axis a part of length ..... length unit.

(a) -6

(b) -2

(c)  $\frac{2}{3}$

(d) 2

3 A circle its centre is the origin point and its radius length is 5 length unit. Which of the following points belongs to the circle ?

(a) (-3 , 4)

(b) (2 , 3)

(c) (1 , 2)

(d) (-5 , 5)

4 If ABCD is a parallelogram in which  $m(\angle A) + m(\angle C) = 200^\circ$  , then  $m(\angle B) = \dots\dots\dots$

(a)  $40^\circ$

(b)  $80^\circ$

(c)  $100^\circ$

(d)  $160^\circ$

5 The acute angle is complemented by an angle .....

(a) acute.

(b) right.

(c) obtuse.

(d) reflex.

6 A triangle with one axis of symmetry and two sides lengths are 4 cm. and 8 cm. , then its perimeter is ..... cm.

(a) 16

(b) 20

(c) 4

(d) 8

2 [a] Without using the calculator , find the value of  $X$  (where  $X$  is the measure of an acute angle) which satisfies :  $\tan X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$

[b] Find the equation of the straight line whose slope equals 2 and passes through the point (1 , 0)

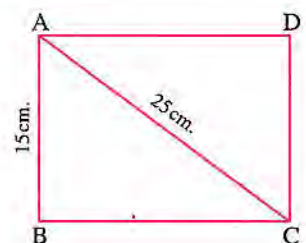
3 [a] In the opposite figure :

ABCD is a rectangle in which  $AB = 15$  cm.

and  $AC = 25$  cm.

Find : 1  $m(\angle ACB)$

2 The surface area of the rectangle ABCD





- [b] If the straight line  $L_1$  passes through the two points  $(4, 3)$ ,  $(2, k)$  and the straight line  $L_2$  makes with the positive direction of the  $X$ -axis a positive angle of measure  $45^\circ$ , find the value of  $k$  if  $L_1 \perp L_2$

- 4 [a] If  $C$  is the midpoint of  $\overline{AB}$  where  $A(-3, y)$ ,  $B(9, 11)$  and  $C(x, 3)$ , find  $x, y$

- [b]  $ABC$  is a triangle in which  $AB = AC = 5$  cm. and  $BC = 8$  cm.

Draw  $\overrightarrow{AD} \perp \overline{BC}$ ,  $\overrightarrow{AD} \cap \overline{BC} = \{D\}$  Prove that :  $\frac{5 \tan B \cos C}{\sin^2 C + \cos^2 B} = 3$

- 5 [a] Prove that the straight line which passes through the two points  $(-1, 3)$ ,  $(1, 4)$  is parallel to the straight line whose equation is  $2y - x = 1$

- [b] Prove that the triangle whose vertices are the points  $A(-3, 0)$ ,  $B(3, 4)$  and  $C(1, -6)$  is an isosceles triangle of vertex  $A$

11

El-Menia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer :

- 1 The sum of the measures of the interior angles of a pentagon equals .....

(a)  $36^\circ$  (b)  $72^\circ$  (c)  $108^\circ$  (d)  $540^\circ$

- 2 The area of the rhombus whose diagonals lengths are 6 cm. and 8 cm. equals .....  $\text{cm}^2$

(a) 10 (b) 20 (c) 24 (d) 48

- 3 The angle whose measure is  $89^\circ 59'$  is .....

(a) acute. (b) right. (c) obtuse. (d) reflex.

- 4 If  $\tan 3X = \sqrt{3}$ ,  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots$

(a)  $10^\circ$  (b)  $20^\circ$  (c)  $30^\circ$  (d)  $60^\circ$

- 5 A circle of centre at the origin point and its radius length is 2 units.

Which of the following points belongs to the circle ?

(a)  $(1, -2)$  (b)  $(-2, \sqrt{5})$  (c)  $(\sqrt{3}, 1)$  (d)  $(0, 1)$

- 6 The equation of the straight line which passes through the point  $(2, 3)$  and is parallel to the  $X$ -axis is .....

(a)  $x = 2$  (b)  $y = 3$  (c)  $y = 2x$  (d)  $x = 3y$



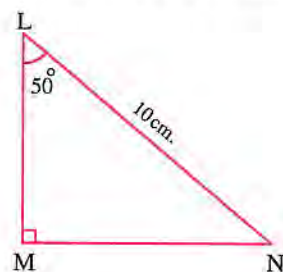
- 2 [a]** Prove that the straight line which passes through the points  $(0, 3)$ ,  $(1, 6)$  is parallel to the straight line  $3x = y - 1$
- [b]** ABC is a right-angled triangle at B,  $AB = 5$  cm. and  $BC = 12$  cm.  
**Prove that :**  $\sin^2 A + \cos^2 A = 1$
- 
- 3 [a]** Find the equation of the straight line whose slope is  $\frac{1}{2}$  and passes through the point  $(2, 3)$
- [b]** If the point C  $(2, -1)$  is the midpoint of  $\overline{AB}$ , A  $(1, 3)$ , find the point B
- 
- 4 [a]** Prove that the triangle of the vertices A  $(1, 3)$ , B  $(3, 2)$  and C  $(0, -4)$  is right-angled at B, then find its surface area.
- [b] Without using calculator, find the value of :**  $(\cos 30^\circ + \sin 60^\circ)^2 - \tan^2 45^\circ$
- 
- 5 [a]** Find the equation of the straight line which passes through the origin point parallel to the straight line that makes an angle of measure  $60^\circ$  with the positive direction of the X-axis.

**[b] In the opposite figure :**

LMN is a right-angled triangle at M

,  $LN = 10$  cm. ,  $m(\angle L) = 50^\circ$

Find the length of  $\overline{LM}$  to the nearest decimal number.



**12**

**Souhag Governorate**



**Answer the following questions :** (Calculator is allowed)

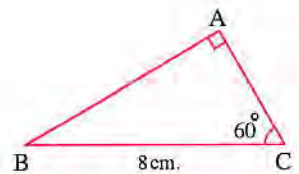
**1 Choose the correct answer from the given ones :**

- 1** The distance between the point  $(4, -3)$  and the X-axis equals ..... length units.  
 (a)  $-3$  (b)  $3$  (c)  $4$  (d)  $5$
- 2** The perimeter of the square whose surface area is  $100 \text{ cm}^2$  equals ..... cm.  
 (a)  $10$  (b)  $20$  (c)  $40$  (d)  $50$
- 3**  $\tan 45^\circ \sin 30^\circ = \dots\dots\dots$   
 (a)  $\frac{1}{2}$  (b)  $1$  (c)  $\frac{2}{3}$  (d)  $\frac{1}{4}$

**4 In the opposite figure :**

The length of  $\overline{AC}$  = ..... cm.

- (a) 2 (b) 6  
(c) 4 (d) 8



**5** If  $\frac{-2}{3}$ ,  $\frac{k}{2}$  are the slopes of two parallel straight lines , then  $k$  = .....

- (a)  $\frac{-4}{3}$  (b)  $\frac{-3}{4}$  (c)  $\frac{1}{3}$  (d) 3

**6** If the lengths 3 , 7 ,  $\ell$  are lengths of sides of a triangle , then  $\ell$  can be equal to .....

- (a) 3 (b) 7 (c) 4 (d) 10

**2 [a]** Without using calculator , find the value of :

$$\cos 60^\circ \sin 30^\circ - \sin 60^\circ \cos 30^\circ$$

**[b]** Identify the type of the triangle whose vertices are A ( - 2 , 4 ) , B ( 3 , - 1 ) , C ( 4 , 5 ) due to its sides lengths.

**3 [a]** If  $\sin^2 45^\circ = \cos E \tan 30^\circ$  , **find** :  $m(\angle E)$  where E is an acute angle.

**[b]**  $\overline{AB}$  is a diameter of the circle M , B ( 8 , 11 ) , M ( 5 , 7 ) , then find the coordinates of A

**4 [a] In the opposite figure :**

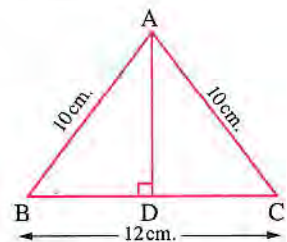
ABC is a triangle in which :

$AB = AC = 10$  cm. ,  $BC = 12$  cm

,  $\overline{AD}$  is perpendicular to  $\overline{BC}$

,  $\overline{AD} \cap \overline{BC} = \{D\}$

**Prove that** :  $\sin^2 B + \cos^2 C = 1$



**[b]** Find the equation of the straight line which passes through the point ( 1 , 6 ) and the midpoint of  $\overline{AB}$  , where A ( 1 , - 2 ) , B ( 3 , - 4 )

**5 [a]** Find the equation of the straight line passing through the point ( 3 , - 5 ) and parallel to the straight line  $x + 2y - 7 = 0$

**[b]** Find the slope of the straight line and the length of the intercepted part of y-axis where its equation is  $4x + 5y - 10 = 0$





Answer the following questions :

**1 Choose the correct answer :**

- 1** A triangle has one axis of symmetry and the lengths of two sides are 3 cm. , 7 cm. , then the length of the third side is ..... cm.  
 (a) 3 (b) 4 (c) 7 (d) 10
- 2** The point of intersection of the medians of the triangle divides each of them by the ratio ..... : 5 from the vertex.  
 (a) 5 (b) 2 (c) 1 (d) 10
- 3** The length of any side of a triangle ..... the sum of lengths of the other two sides.  
 (a) > (b)  $\geq$  (c) < (d) =
- 4** If  $\sin 2X = \frac{1}{2}$  where  $2X$  is the measure of an acute angle , then  $\tan 3X = \dots\dots\dots$   
 (a)  $\frac{1}{2}$  (b)  $\frac{1}{\sqrt{3}}$  (c)  $\sqrt{3}$  (d) 1
- 5** The distance between the point  $(-3, -4)$  and the  $X$ -axis is ..... length units.  
 (a) 3 (b)  $-3$  (c) 4 (d)  $-4$
- 6** The area of the triangle bounded by the straight lines  $3X + 8y = 24$  ,  $X = 0$  ,  $y = 0$  equals ..... square unit.  
 (a) 24 (b) 8 (c) 12 (d) 3

**2 [a] ABC is a triangle right-angled at C , AB = 13 cm. , BC = 12 cm.**

- 1 Find :** The length of  $\overline{AC}$
- 2 Prove that :**  $\sin A \cos B + \cos A \sin B = 1$
- 3 Find the value of :**  $1 + \tan^2 A$

**[b] Prove that the points A  $(3, -1)$  , B  $(-4, 6)$  , C  $(2, -2)$  lie on a circle whose centre is M  $(-1, 2)$  , then find the circumference of the circle in terms of  $\pi$**

**3 [a] Find the value of X if :  $4X = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$**

**[b] If C is the midpoint of  $\overline{AB}$  , find X and y where A  $(X, 3)$  , B  $(6, y)$  , C  $(4, 6)$**



- 4 [a] A ladder of length 6 m. , its upper end A is on a vertical wall and its lower end B is on a horizontal ground , if C is the projection of the point A on the ground and the ladder inclines by an angle of measure  $60^\circ$  on the ground , find the length of  $\overline{AC}$

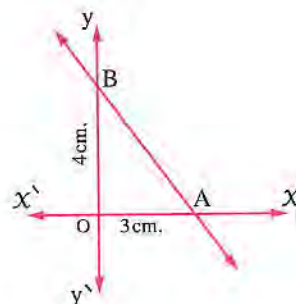
[b] If A (2 , - 1) , B (1 , 1) , find the equation of  $\overleftrightarrow{AB}$

- 5 [a] If the points X (0 , 1) , Y (a , 3) , Z (2 , 5) are collinear , find the value of a

[b] In the opposite figure :

$\overleftrightarrow{AB}$  is a straight line Find :

- [1] The coordinates of the midpoint of  $\overline{AB}$   
 [2] The equation of the straight line passing by the origin point perpendicular to  $\overleftrightarrow{AB}$



## 14 South Sinai Governorate



Answer the following questions :

- 1 Choose the correct answer from the given answers :

[1]  $\cos 60^\circ = \dots\dots\dots$

(a)  $\frac{1}{2}$

(b)  $\frac{\sqrt{3}}{2}$

(c)  $\frac{1}{\sqrt{2}}$

(d)  $\sqrt{3}$

[2] The number of axes of symmetry of an equilateral triangle equals .....

(a) zero.

(b) 1

(c) 2

(d) 3

[3] The points (0 , 0) , (6 , 0) and (0 , 8) .....

(a) form an acute-angled triangle.

(b) form a right-angled triangle.

(c) form an obtuse-angled triangle.

(d) are collinear.

[4] The equation of the straight line which passes through the point (2 , 3) and is parallel to y-axis is .....

(a)  $x = 2$

(b)  $x = 3$

(c)  $y = 2$

(d)  $y = 3$

[5] The distance between the point  $(\sqrt{3} , 1)$  and the origin point is ..... length units.

(a) 4

(b) 3

(c) 2

(d)  $\sqrt{10}$

[6] If the perimeter of a square is 4 cm. , then its area is .....  $\text{cm}^2$

(a) 16

(b) 4

(c) 2

(d) 1

- 2 [a]** If  $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$ , find the value of  $X$  where  $X$  is the measure of an acute angle.
- [b]** Find the equation of the straight line whose slope equals 2 and intersects from the negative part of the  $y$ -axis a part of length 3 units.
- 
- 3 [a]** If the point  $(4, 6)$  is the midpoint of the distance between  $(X, 3)$ ,  $(6, y)$ , find the value of  $Xy$ .
- [b] Without using calculator, prove that :**  $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$
- 
- 4 [a]** Prove that the points  $A(-3, 0)$ ,  $B(3, 4)$ ,  $C(1, -6)$  are the vertices of an isosceles triangle.
- [b]** Find the equation of the straight line perpendicular to  $\overline{AB}$  from its midpoint where  $A(1, 3)$ ,  $B(3, 5)$
- 
- 5 [a]**  $XYZ$  is a right-angled triangle at  $Y$  in which  $XY = 5$  cm.,  $XZ = 13$  cm.  
**Find :** **[1]** The length of  $\overline{YZ}$  **[2]**  $\cos X \cos Z - \sin X \sin Z$
- [b]** Prove that the straight line passing through the two points  $(2, -1)$ ,  $(6, 3)$  is parallel to the straight line that makes with the positive direction of the  $X$ -axis an angle of measure  $45^\circ$

**15****Matrouh Governorate**

**Answer the following questions : (Calculator is allowed)**

- 1 Choose the correct answer from those given :**
- [1]** If  $m_1, m_2$  are the slopes of two perpendicular straight lines, then  $m_1 \times m_2 = \dots\dots\dots$   
 (a) 0 (b) 1 (c) -1 (d) 2
- [2]** The number of the symmetry axes of an isosceles triangle is  $\dots\dots\dots$   
 (a) 0 (b) 1 (c) 2 (d) 3
- [3]** In a parallelogram, the diagonals are  $\dots\dots\dots$   
 (a) perpendicular. (b) equal in length.  
 (c) bisecting each other. (d) perpendicular and equal in length.
- [4]** If  $A(5, 7)$ ,  $B(1, -1)$ , then the midpoint of  $\overline{AB}$  is  $\dots\dots\dots$   
 (a)  $(2, 3)$  (b)  $(3, 3)$  (c)  $(3, 2)$  (d)  $(3, 4)$



## Trigonometry and Geometry

5 A circle has a surface area of  $4\pi \text{ cm}^2$ , then its radius length is ..... cm.

- (a) 2                      (b) 4                      (c)  $2\pi$                       (d)  $4\pi$

6 In  $\triangle ABC$ , if  $m(\angle A) = 60^\circ$ ,  $\sin B = \cos B$ , then  $m(\angle C) = \dots\dots\dots$

- (a)  $30^\circ$                       (b)  $75^\circ$                       (c)  $90^\circ$                       (d)  $105^\circ$

2 [a]  $\triangle ABC$  is right-angled at C,  $AC = 5 \text{ cm}$ ,  $AB = 13 \text{ cm}$ .

Find : 1  $\sin A \cos B + \cos A \sin B$                       2  $1 + \tan^2 B$

[b] Prove that the points A (4, 3), B (1, 1), C (-5, -3) are collinear.

3 [a] Find the value of X if :  $X \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

[b] Find the slope and the intercepted part of y-axis of the straight line whose equation is  $4x + 5y - 10 = 0$

4 [a] Find the equation of the straight line which passes through the point (1, 6) and the midpoint of  $\overline{AB}$  where A (1, -2), B (3, -4)

[b] State the kind of the triangle ABC, where A (-2, 4), B (3, -1) and C (4, 5) with respect to its sides.

5 [a] If  $4 \cos 60^\circ \sin 30^\circ = \tan \theta$ , find :  $m(\angle \theta)$  where  $\theta$  is an acute angle.

[b] Prove by using the slope that the points A (-1, 3), B (5, 1), C (6, 4), D (0, 6) are the vertices of a rectangle.





حمل الآن

مجاناً وحصرياً

# امتحانات رقم (3)

## الترم الاول





Answer the following questions : (Calculator is allowed)

**1 Choose the correct answer from those given :**

**1** If  $(a + 3, b - 1) = (-2, 4)$ , then  $a + b = \dots\dots\dots$

- (a) 0 (b) 2 (c) 5 (d) 10

**2** If  $X - y = 5$ , then  $6X - 6y = \dots\dots\dots$

- (a) 30 (b) 11 (c) 1 (d) -1

**3** If  $X, 3, 4$  and  $6$  are proportional, then  $X = \dots\dots\dots$

- (a) 0 (b) 1 (c) 2 (d) 3

**4**  $\{3\} \cup ]3, 5] = \dots\dots\dots$

- (a)  $\emptyset$  (b)  $\{3\}$  (c)  $]3, 5]$  (d)  $[3, 5]$

**5** The positive square root of mean of the squares of deviations of the values from their arithmetic mean is called  $\dots\dots\dots$

- (a) the range. (b) the standard deviation.  
(c) the median. (d) the mean.

**6** If  $X^2 = 25$ , where  $X \in \mathbb{Z}$ , then  $X = \dots\dots\dots$

- (a) 5 (b) -5 (c)  $\pm 5$  (d) -25

**2 [a] If  $X = \{2\}$ ,  $Y = \{3, 4, 5\}$ , find :**

- 1**  $X \times Y$  **2**  $n(Y^2)$  **3**  $X^2$

**[b] If  $\frac{a}{b} = \frac{3}{5}$ , then find the value of  $\frac{7a + 9b}{4a + 2b}$  in the simplest form.**

**3 [a] If  $y \propto \frac{1}{x}$  and  $y = 3$ , when  $x = 2$ , find :**

- 1** The relation between  $y$  and  $x$  **2** The value of  $y$  when  $x = 1.5$

**[b] If  $X = \{1, 3, 4, 5\}$ ,  $Y = \{2, 3, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a + b = 7$ " for all  $a \in X, b \in Y$  write  $R$  and represent it by an arrow diagram. Is  $R$  a function? Why?**

**4 [a] The following frequency distribution shows the ages of 10 children :**

Ages in years	5	8	9	10	12	Total
Number of children	1	2	3	3	1	10

Calculate the standard deviation to ages in years.

[b] Graph the curve of the function  $f : f(x) = x^2 + 2x - 4$ , where  $x \in [-4, 2]$

From the graph find :

1 The vertex of the curve.

2 The equation of the axis of symmetry.

5 [a] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

[b] If  $f(x) = x^2 - 2x$ ,  $g(x) = x - 2$

1 Prove that :  $f(2) = g(2)$

2 If  $g(k) = 7$ , find : the value of  $k$

## 2 Giza Governorate



Answer the following questions :

1 Choose the correct answer :

1 If  $x \in \mathbb{R}$  and  $1 < x < 3$ , then  $(3x - 1) \in \dots\dots\dots$

(a)  $]2, 8[$  (b)  $[2, 8]$  (c)  $]2, 8]$  (d)  $\{2, 8\}$

2 The range of the set of the values : 7, 3, 6, 5, 9 is  $\dots\dots\dots$

(a) 3 (b) 4 (c) 6 (d) 12

3 Half of the number  $4^{20} = \dots\dots\dots$

(a)  $2^{20}$  (b)  $2^{39}$  (c)  $2^{29}$  (d)  $4^{19}$

4 If  $X, Y$  are two non empty sets and  $n(X^2) = 4$ ,  $n(X \times Y) = 6$ , then  $n(Y^2) = \dots\dots\dots$

(a) 4 (b) 9 (c) 16 (d) 12

5 If  $a \times \frac{b}{3} = \frac{a}{3}$ , then  $b = \dots\dots\dots$

(a)  $-a$  (b) 1 (c)  $\frac{a}{3}$  (d)  $a$

6 If  $xy = 7$ , then  $y \propto \dots\dots\dots$

(a)  $\frac{1}{x}$  (b)  $x - 7$  (c)  $x$  (d)  $x + 7$

2 [a] If  $(x + 3, 9) = (5, y^2)$ , then find : the value of each of  $x$  and  $y$

[b] If  $y \propto \frac{1}{x}$  and  $y = 4$  when  $x = 2$ , then find :

1 The relation between  $x$  and  $y$

2 The value of  $y$  when  $x = 8$

3 [a] If  $X = \{0, 1, 2, 3, 4, 5, 6\}$  and  $R$  is a relation on  $X$  "where  $a R b$ " means " $a$  double  $b$ " for all  $a \in X, b \in X$

1 Write  $R$  as a set of ordered pairs and show if it is a function or not.

2 Is  $2 R 4$ ?

3 Find the value of  $x$  if  $6 R x$

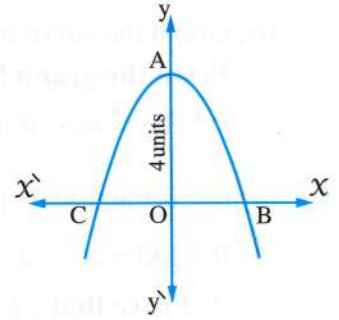
[b] If  $b$  is the middle proportional between  $a$  and  $c$ , then prove that :  $\frac{a-b}{a-c} = \frac{b}{b+c}$



- 4 [a] The opposite figure represents the curve of the function  $f : f(x) = m - x^2$

If  $OA = 4$  units , then find :

- 1 The value of  $m$
- 2 The coordinates of the two points B and C
- 3 The area of the triangle whose vertices are A , B , C



- [b] If the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  where  $f(x) = 2x + a$  and  $f(3) = 9$  , then find :

- 1 The value of  $a$
- 2 The coordinates of the intersection point of the straight line representing the function with  $x$ -axis

- 5 [a] If  $\frac{x}{2} = \frac{y}{3} = \frac{z}{4} = \frac{2x - y + 5z}{3m}$  , then find : the value of  $m$

- [b] Find the standard deviation of the values : 4 , 8 , 12 , 10 , 6

### 3 Alexandria Governorate



Answer the following questions : (Calculators are allowed)

- 1 Choose the correct answer from those given :

- 1 If  $(3, 5) \in \{3, 6\} \times \{x, 8\}$  , then  $x = \dots\dots\dots$

- (a) 8 (b) 6 (c) 5 (d) 3

- 2 A quarter of the number  $2^8$  is  $\dots\dots\dots$

- (a)  $2^6$  (b)  $2^{10}$  (c)  $\left(\frac{1}{2}\right)^8$  (d)  $\left(\frac{1}{2}\right)^6$

- 3 If  $\frac{3a}{5b} = \frac{1}{2}$  , then  $\frac{a}{b} = \dots\dots\dots$

- (a)  $\frac{6}{5}$  (b)  $\frac{5}{6}$  (c)  $\frac{2}{3}$  (d)  $\frac{3}{2}$

- 4 If  $x$  is an odd number , then the next odd number directly is  $\dots\dots\dots$

- (a)  $x^2$  (b)  $x^2 + 1$  (c)  $x + 1$  (d)  $x + 2$

- 5  $\frac{\text{Sum of the values}}{\text{Their number}}$  is  $\dots\dots\dots$

- (a) the range. (b) the standard deviation.  
(c) the mode. (d) the arithmetic mean.

- 6 If  $3 > x > 1$  ,  $x \in \mathbb{R}$  , then  $(3x - 1) \in \dots\dots\dots$

- (a)  $\{2, 8\}$  (b)  $]2, 8[$  (c)  $[2, 8]$  (d)  $[2, 8[$

2 [a] If  $X = \{2, 5\}$  ,  $Y = \{1, 2\}$  ,  $Z = \{3\}$

, find : 1  $n(X \times Z)$

2  $(Y \cap X) \times Z$

[b] Find the number which if its square is added to each of the two terms of the ratio 5 : 11 it becomes 3 : 5

3 [a] If  $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$  , find the value of :  $\frac{2y - z}{3x - 2y + z}$

[b] If  $X = \{1, 3, 4, 5\}$  ,  $Y = \{1, 2, 3, 4, 5, 6\}$  , and R is a relation from X to Y where "a R b" means "a + b = 7" for all  $a \in X$  ,  $b \in Y$  , write the relation R and represent it by an arrow diagram. Is R a function ? and why ?

4 [a] If y varies inversely with x , y = 2 when x = 4 , find :

1 The relation between y and x

2 The value of y when x = 16

[b] The following frequency distribution shows the ages of 20 persons :

Ages in years	15	20	22	23	25	30	Total
Number of persons	2	3	5	5	1	4	20

Calculate the standard deviation to ages.

5 [a] Represent graphically the function f where  $f(x) = 4 - x^2$  taking  $x \in [-3, 3]$  and from the drawing deduce :

1 The coordinates of the vertex of the curve.

2 The maximum or the minimum value of the function.

3 The equation of the symmetry axis

[b] If  $f(x) = 5x - a$  ,  $r(x) = x - 2a$  and  $f(1) + r(3) = -7$  , find : the value of a

## 4 El-Kalyoubia Governorate



Answer the following questions :

1 Choose the correct answer from the given answers :

1 If the point (5 , b - 7) lies on the x-axis , then b = .....

(a) 2

(b) 5

(c) 7

(d) 12

2 If  $f(x) = 7$  , then  $f(7) + f(-7) = \dots\dots\dots$

(a) 7

(b) -7

(c) -14

(d) 14

## Algebra and Statistics

3 If  $\sqrt[3]{-27} = -\sqrt{X}$ , then  $X = \dots\dots\dots$

- (a) 9 (b) -9 (c) 3 (d) -3

4 If  $\frac{a}{3} = \frac{b}{4}$ , then  $8a - 6b + 4 = \dots\dots\dots$

- (a) 3 (b) 4 (c) 5 (d) 6

5 If  $X = \{2\}$ , then  $X^2 = \dots\dots\dots$

- (a) 4 (b)  $\{4\}$  (c)  $(2, 2)$  (d)  $\{(2, 2)\}$

6 The positive square root of the average of squares of deviations of the values from their mean is called  $\dots\dots\dots$

- (a) the mean. (b) the range.  
(c) the standard deviation. (d) the mode.

2 [a] If  $y$  varies inversely as  $X$  and  $y = 3$  as  $X = 2$

1 Find the relation between  $X$  and  $y$

2 Find the value of  $y$  when  $X = \frac{3}{2}$

[b] If  $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3X}$ , find : the value of  $X$

3 [a] If  $X = \{1, 3, 5\}$ ,  $Y = \{2, 3, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$ , where " $a R b$ " means " $a + b = 7$ " for each  $a \in X, b \in Y$

1 Write  $R$  and represent it by an arrow diagram.

2 Is  $R$  a function? and why?

[b] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a-c}{a-b} = \frac{b+c}{b}$

4 [a] If  $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$

, find : 1  $X, Y$

2  $Y \times X$

[b] Represent graphically the function  $f : f(X) = 2 - X^2$  since  $X \in [-3, 3]$

and find from the drawing deduce :

- 1 The coordinates of the vertex of the curve. 2 The maximum value of the function.  
3 The equation of the symmetry axis.

5 [a] If  $X = \{1, 3, 5\}$  and  $R$  is a function on  $X$  where  $R = \{(a, 3), (b, 1), (1, 5)\}$ , find :

1 The range of the function.

2 The numerical value of  $a + b$

[b] Find the mean and the standard deviation for the following frequency distribution :

Set	zero -	2 -	4 -	6 -	8 - 10	Total
Frequency	1	3	6	5	5	20



## 5 El-Monofia Governorate



**Answer the following questions :** (Using calculator is permitted)

### 1 Choose the correct answer :

1 If  $\frac{5}{4} + \frac{5}{x} = \frac{5}{2}$ , then  $x = \dots\dots\dots$

- (a) 2                      (b) 4                      (c) 5                      (d)  $\frac{5}{2}$

2 If  $x + y = xy = 5$ , then  $x^2y + xy^2 = \dots\dots\dots$

- (a) 10                      (b) 15                      (c) 20                      (d) 25

3 If  $1 < x < 3$ ,  $x \in \mathbb{R}$ , then  $(3x - 1) \in \dots\dots\dots$

- (a)  $[2, 8[$                       (b)  $[2, 8]$                       (c)  $]2, 8[$                       (d)  $\{2, 8\}$

4 If  $\frac{a+2b}{a-b} = \frac{2}{3}$ , then  $\frac{b}{a} = \dots\dots\dots$

- (a)  $\frac{1}{8}$                       (b) 8                      (c)  $-\frac{1}{8}$                       (d) -8

5 Which of the following values of the number  $x$  makes the range of the set of the values  $x, 15, 20, 24$  equal to 14?

- (a) 30                      (b) 25                      (c) 19                      (d) 10

6 If  $x \in \mathbb{R}_-$ , then the point  $(-x, \sqrt[3]{x})$  lies in the ..... quadrant.

- (a) first                      (b) second                      (c) third                      (d) fourth

2 [a] If  $X = \{4, 3\}$ ,  $Y = \{5, 4\}$  and  $Z = \{5, 6\}$ , find :

- 1  $X \times (Y \cap Z)$                       2  $(X - Y) \times Z$                       3  $n(Z^2)$

[b] If  $a, b, c$  and  $d$  are in continued proportion, prove that :  $\frac{ab - cd}{b^2 - c^2} = \frac{a + c}{b}$

3 [a] If  $X = \{-2, -1, 1, 2\}$ ,  $Y = \{8, \frac{1}{3}, -1, 1, -8\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $b = a^3$ " for each  $a \in X, b \in Y$

- 1 Write  $R$  and represent it by an arrow diagram.  
2 Show that  $R$  is a function and find its range.

[b] If the straight line that represents the function  $f$  where  $f : \mathbb{R} \rightarrow \mathbb{R}$  where  $f(x) = ax + b$  cuts  $y$ -axis at the point  $(0, 3)$  and  $f(2) = 7$ ,  
find : the values of  $a$  and  $b$

- 4 [a] Find the number that if its square is added to the terms of the ratio 7 : 11 , then it will become 4 : 5

[b] If  $y$  varies inversely as  $X^2$  and  $X = 3$  when  $y = 4$  , find :

- 1 The relation between  $X$  and  $y$       2 The value of  $X$  when  $y = 9$

- 5 [a] Draw the curve of the function  $f$  where  $f(X) = 1 - X^2$  taking  $X \in [-3, 3]$  and from the graph find :

- 1 The coordinates of the vertex of the curve.  
2 The equation of the axis of symmetry.  
3 The area of the triangle whose vertices are the intersection points of the curve with the two axes.

[b] The following frequency distribution shows the number of children of some families in a new city :

Number of children	zero	1	2	3	4
Number of families	8	16	50	20	6

Calculate the mean and the standard deviation of the number of children.

## 6

## El-Gharbia Governorate



Answer the following questions : (Calculators are allowed)

- 1 Choose the correct answer :

1 The function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  where  $f(X) = aX + b$  represents a linear function on condition  $a \in \dots\dots\dots$

- (a)  $\mathbb{R}$       (b)  $\mathbb{R}_+$       (c)  $\mathbb{R} - \{0\}$       (d)  $\mathbb{R}_-$

2 The fourth proportional of the numbers : 4 , 12 , 16 is .....

- (a) 24      (b)  $\pm 24$       (c) 48      (d)  $\pm 48$

3 If the weekly wages in pounds of a set of workers in a factory are 170 , 180 , 180 , 230 and 240 , then the median of wages equals .....

- (a) 200      (b) 70      (c) 180      (d) 205

4 If  $X^2 + y^2 = 6$  ,  $XY = 5$  , then  $(X + y)^2 = \dots\dots\dots$

- (a) 16      (b)  $\pm 16$       (c) 11      (d)  $\pm 11$

5 The relation which represents the direct variation between  $y$  and  $X$  is .....

- (a)  $XY = 5$       (b)  $y = 3 - X$       (c)  $\frac{X}{3} = \frac{y}{5}$       (d)  $\frac{X}{3} = \frac{4}{y}$

- 6 If  $X = \{1, 3, 5\}$  and  $R$  is a function on  $X$  where  $R = \{(a, 3), (b, 1), (1, 5)\}$ , then the numerical value of  $a + b = \dots\dots\dots$

(a) 4 (b) 6 (c) 8 (d) other.

- 2 [a] If  $X = \{-1, \text{zero}, 2, 3\}$ ,  $Y = \{1, \text{zero}, \frac{1}{2}, \frac{1}{3}\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means "The number  $a$  is the multiplicative inverse of the number  $b$ " for each  $a \in X, b \in Y$ , write  $R$ , and represent it by an arrow diagram and show if  $R$  is a function or not? And why?

- [b] From the data of the following table answer the following questions :

$x$	2	4	6
$y$	6	3	2

- 1 Show the kind of variation between  $x$  and  $y$   
 2 Find the constant proportional.  
 3 Find the value of  $y$  when  $x = 3$

- 3 [a] If  $a, b, c$  and  $d$  are in continued proportion, prove that :  $\frac{a}{b+d} = \frac{c^3}{c^2d+d^3}$

- [b] If  $X = \{6\}$ ,  $Y = \{2, 3\}$  and  $Z = \{2, 5, 6\}$ , find :

- 1  $n(X^2)$  2  $(Z - Y) \times (X \cap Z)$

- 4 [a] Two integers the ratio between them is  $2 : 3$ , if you add to the first 7 and subtract from the second 12, the ratio between them becomes  $5 : 3$ , find the two integers.

- [b] If the function  $f : f(x) = 3x - 6$  represents a straight line passing through the point  $(a, 2a)$ , find the value of  $a$ , and find the intersection point of the straight line with  $y$ -axis.

- 5 [a] Calculate the standard deviation for the following data :

16, 32, 5, 20, 27 rounding the result to one decimal place.

- [b] Represent graphically the function  $f : f(x) = (x - 2)^2$ , taking  $x \in [-1, 5]$  and from the graph deduce :

- 1 The equation of the axis of symmetry.  
 2 The maximum value or the minimum value of the function.





**Answer the following questions : (Calculator is permitted)**

**1 [a] Choose the correct answer :**

**1** The point  $(X - 3, 2 - X)$  lies in the fourth quadrant , then  $X = \dots\dots\dots$

- (a) 4                      (b) 3                      (c) 2                      (d) 1

**2** If  $d(X) = cX + 8$  ,  $d(2) = 0$  , then  $c = \dots\dots\dots$

- (a) 8                      (b) 6                      (c) 4                      (d) -4

**3** If  $a, 2, 4, b$  are in continued proportion , then  $a + b = \dots\dots\dots$

- (a) 2                      (b) 4                      (c) 6                      (d) 9

**[b]** If  $b$  is the middle proportional between  $a$  and  $c$  , **prove that :**  $\frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c}{a}$

**2 [a] Choose the correct answer :**

**1** If  $y \propto X$  ,  $y \propto \frac{1}{d}$  , then  $y \propto \dots\dots\dots$

- (a)  $Xd$                       (b)  $\frac{d}{X}$                       (c)  $\frac{X}{d}$                       (d)  $X^2d$

**2** The standard deviation of the values  $5, 5, 5, 5$  equals  $\dots\dots\dots$

- (a) zero                      (b) 5                      (c) 6                      (d) 2

**3** The function  $d : d(X) = X^2 - (X - 3)^2$  is of the  $\dots\dots\dots$  degree.

- (a) zero                      (b) first                      (c) second                      (d) third

**[b]** If  $(-1, 2)$  is the point of the vertex of the curve of the function  $d : d(X) = aX^2 - 6X + c$  , **find :** the value of  $c$

**3 [a]** If  $3a = 4b = 6c$  , **find :**  $a : b : c$  , and the value of :  $\frac{3a + 2b}{a + 4c}$

**[b]** If  $X = \{-2, -1, 0, 1, 2\}$  ,  $R$  is a relation on the set  $X$  where " $a R b$ " means " $a$  is the additive inverse of the number  $b$ " for every  $a \in X$  and  $b \in X$  , state  $R$  , then represent it by an arrow diagram , and mention giving reasons if  $R$  represents a function or not.

**4 [a]** If  $X = z + 8$  where  $z$  varies inversely as  $y$  and  $z = 2$  when  $y = 3$  , find the relation between  $y$  and  $X$  , **then find :**  $y$  when  $X = 3$

**[b]** If  $d(X) = 2X + 5$  ,  $r(X) = X - 6$  , **prove that :**  $d(2) + 3r(3) = 0$

**5 [a]** Calculate the mean and the standard deviation of the following data :  $5, 7, 8, 9, 6$

**[b]** If  $(X - 2, 3^{y-1}) = (3, 1)$  , **find :**  $X, y$



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from those given :

1  $\sqrt{36} + \sqrt{16} = \dots\dots\dots$

- (a) 10                      (b) 24                      (c) 52                      (d) 100

2 The middle proportional between 3 , 27 is .....

- (a) 9                      (b) - 9                      (c)  $\pm 9$                       (d) 1

3 If  $f(x) = 2$  , then  $f(2) + f(-2) = \dots\dots\dots$

- (a) zero                      (b) 4                      (c) - 4                      (d) 1

4 The positive number which twice its square equals 50 is .....

- (a) 5                      (b) 10                      (c) 25                      (d) 100

5 If  $x + y = xy = 5$  , then  $x^2 y + y^2 x = \dots\dots\dots$

- (a) 10                      (b) 15                      (c) 20                      (d) 25

6 The simplest and easiest method of measuring dispersion is .....

- (a) the range.                      (b) the standard deviation.  
(c) the arithmetic mean.                      (d) the mode.

2 [a] If  $X = \{2, 3, 5\}$  ,  $Y = \{4, 6, 8, 10\}$  and R is a relation from X to Y where "a R b" means " $2a = b$ " for all  $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram.

2 Is the relation R a function ? Why ? and if it's a function , find its range.

[b] The ratio between two integers is 3 : 7 If 5 is subtracted from each of them , then the ratio becomes 1 : 3 , find the two integers.

3 [a] As Yousef was reading a book , he found out after 3 hours 50 pages remained , after 6 hours 20 pages remained. If there was a relation between the time (t) and the number of pages (y) Is a linear relation.

1 Represent the relation between (t) and (y) , then find the algebraic relation between them.

2 How much time did Yousef takes to finish reading the book ?

3 How many pages left when Yousef started reading ?

[b] If  $x, y, z$  and  $l$  are proportional quantities , prove that :  $\frac{y-x}{x} = \frac{l-z}{z}$

- 4 [a] If  $y \propto X$  and  $y = 40$  at  $X = 14$ , find the relation between  $X$  and  $y$ , then find the value of  $X$  when  $y = 80$
- [b] If  $X \times Y = \{(1, 2), (1, 3), (2, 2), (2, 3)\}$   
 , find : 1  $X \cup Y$  2  $n(Y^2)$
- 5 [a] Represent graphically the function  $f : f(X) = (X - 2)^2$ , taking  $X \in [-1, 5]$   
 And from the graph find :  
 1 The coordinates of the vertex of the curve. 2 The equation of the line of symmetry.  
 3 The maximum or the minimum value of the function.
- [b] Find the standard deviation for the following set of values : 13, 14, 17, 19, 22

## 9 Suez Governorate



Answer the following questions : (Calculators are allowed)

- 1 Choose the correct answer from those given :
- 1 If  $(2, 3) \in \{2, 5\} \times \{X, 6\}$ , then  $X = \dots\dots\dots$   
 (a) 6 (b) 5 (c) 3 (d) 2
- 2  $(\sqrt{5} - 3)(\sqrt{5} + 3) = \dots\dots\dots$   
 (a) 8 (b) 2 (c) 4 (d) -4
- 3 The positive square root of the mean of the squares of deviations of the values from their arithmetic mean is called .....  
 (a) the range. (b) the arithmetic mean.  
 (c) the standard deviation. (d) the mode.
- 4 If the number  $\frac{3}{b} + 1 = 4$ , then  $b = \dots\dots\dots$  where  $b \neq 0$   
 (a) 1 (b) 2 (c) 3 (d) 4
- 5  $\mathbb{Z}_- \cup \mathbb{N} = \dots\dots\dots$   
 (a)  $\emptyset$  (b)  $\mathbb{Z}$  (c)  $\mathbb{N}$  (d)  $\mathbb{R}$
- 6 If  $\frac{a}{b} = \frac{c}{d} = m$  (where  $m \in \mathbb{R}^*$ ), then  $\frac{ac}{bd} = \dots\dots\dots$   
 (a)  $m$  (b)  $m^2$  (c)  $2m$  (d)  $2m^2$
- 2 [a] If  $X = \{1, 2, 3\}$ ,  $Y = \{1, 4, 6, 9\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a = \sqrt{b}$ " for all  $a \in X, b \in Y$   
 1 Find the relation  $R$  2 Represent the relation  $R$  by an arrow diagram.  
 3 Is  $R$  a function? Why?
- [b] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c}{a}$



3 [a] If  $(2x, 4) = (8, y + 1)$ , find :  $\sqrt{x^2 + y^2}$

[b] If  $y \propto x$  and  $y = 2$  when  $x = 8$ , find :

1 The relation between  $y$  and  $x$

2 The value of  $y$  when  $x = 12$

4 [a] Draw the curve of the function  $f : f(x) = x^2 + 1$ , taking  $x \in [-2, 2]$

and from the graph find :

1 The coordinates of the vertex of the curve. 2 The equation of the axis of symmetry.

3 The minimum value.

[b] If  $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3x}$ , find :  $x$

5 [a] If  $X = \{1, 3, 5\}$  and  $R$  is a function on  $X$  where  $R = \{(a, 3), (b, 1), (1, 5)\}$ , find :

1 The range of the function.

2 The numerical value of the expression  $a + b$

[b] Calculate the standard deviation for the values : 8, 9, 7, 6, 5

## 10 Port Said Governorate



Answer the following questions :

1 Choose the correct answer from those given :

1  $[1, 3] - \{0, 1\} = \dots\dots\dots$

(a)  $]1, 3[$

(b)  $]1, 3]$

(c)  $[1, 3[$

(d)  $\{3\}$

2 If  $2^x = 2^6$ , then  $x = \dots\dots\dots$

(a) 3

(b) 4

(c) 6

(d) 64

3 20% from 10 pounds =  $\dots\dots\dots$  pounds.

(a) 2

(b) 2.5

(c) 5

(d) 20

4 If  $n(X) = 3$ ,  $n(X \times Y) = 12$ , then  $n(Y) = \dots\dots\dots$

(a) 4

(b) 9

(c) 15

(d) 36

5 If  $3a = 4b$ , then  $a : b = \dots\dots\dots$

(a)  $3 : 4$

(b)  $4 : 7$

(c)  $3 : 7$

(d)  $4 : 3$

6 The range of the set of the values 7, 3, 6, 9 and 5 equals  $\dots\dots\dots$

(a) 3

(b) 4

(c) 6

(d) 12

- 2 [a]** If  $X = \{2, 3, 4\}$ ,  $Y = \{2, 3, 4, 5, 6, 7, 8\}$ ,  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a = \frac{1}{2} b$ " for each  $a \in X, b \in Y$ , write  $R$  and represent it by an arrow diagram. Show that  $R$  is a function from  $X$  to  $Y$  and find its range.
- [b]** If  $f(x) = 4x + b$  and  $f(3) = 15$ , **find** : the value of  $b$
- 
- 3 [a]** If  $f(x) = x^2 - 3x$ ,  $g(x) = x - 3$
- [1]** Find :  $f(\sqrt{2}) + 3g(\sqrt{2})$  **[2]** Prove that :  $f(3) = g(3) = 0$
- [b]** Represent graphically the quadratic function  $f$  where  $f(x) = x^2$ ,  $x \in \mathbb{R}$ , consider  $x \in [-3, 3]$ , from the graph deduce the vertex of the curve, the minimum value of the function, the equation of the axis of symmetry.
- 
- 4 [a]** If  $b$  is the middle proportional between  $a$  and  $c$ , **prove that** :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$
- [b]** If  $y \propto x$ , where  $y = 14$  when  $x = 42$ , **then find** :
- [1]** The relation between  $x$  and  $y$  **[2]** The value of  $y$  when  $x = 60$
- 
- 5 [a]** Calculate the standard deviation for the values : 16, 32, 5, 20, 27
- [b]** If the height of a right constant cylinder (constant volume) is  $(h)$  varies inversely as the square of its radius length  $r$  and  $h = 27$  cm. when  $r = 10.5$  cm., find  $h$  when  $r = 15.75$  cm.

## 11

## Damietta Governorate



**Answer the following questions : (Calculators are allowed)**

- 1 Choose the correct answer from the given ones :**
- [1]** If  $n(X) = 3$ ,  $n(Y^2) = 4$ , then  $n(X \times Y) = \dots\dots\dots$
- (a) 6 (b) 12 (c) 18 (d) 36
- [2]** The range of the set of the values 7, 4, 6, 9 and 5 equals  $\dots\dots\dots$
- (a) 3 (b) 4 (c) 5 (d) 6
- [3]** If  $\frac{y}{x} = 5$ , then  $y \propto \dots\dots\dots$
- (a)  $x$  (b)  $\frac{1}{x}$  (c)  $x - 5$  (d)  $x + 5$
- [4]** If  $\frac{3}{4} + \frac{3}{x} = \frac{3}{2}$ , then  $x = \dots\dots\dots$
- (a)  $\frac{3}{2}$  (b) 2 (c) 3 (d) 4
- [5]** The third proportional of the two numbers 3 and 6 is  $\dots\dots\dots$
- (a)  $\frac{1}{2}$  (b) 2 (c) 9 (d) 12

6 The solution set of the equation  $(X - 1)^2 = 9$  in  $\mathbb{R}$  is .....

- (a)  $\{4\}$  (b)  $\{-2\}$  (c)  $\{4, -2\}$  (d)  $\{3\}$

2 [a] If  $X = \{1, 9, 6\}$ ,  $Y = \{3, 4, 5, 6\}$ ,  $Z = \{4\}$ , then find :  $(X - Y) \times Z$

[b] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

3 [a] If  $y \propto \frac{1}{x}$  and  $y = 3$  when  $x = 2$

1 Find the relation between  $x$  and  $y$

2 Find the value of  $y$  when  $x = 1.5$

[b] If  $\frac{y}{x-z} = \frac{x}{y} = \frac{x+y}{z}$ , prove that :

1 Each ratio is equal to 2 (unless  $x + y = 0$ )

2  $3y = 2z$

4 [a] If  $(x^3, y + 1) = (8, 3)$ , find the value of :  $\sqrt[3]{x + 3y}$

[b] If  $X = \{-1, 0, 2, 3\}$ ,  $Y = \{0, 1, 4, 6, 9\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a^2 = b$ " for each  $a \in X, b \in Y$

1 Write  $R$  and represent it by an arrow diagram

2 Show that  $R$  is a function from  $X$  to  $Y$  and find its range.

5 [a] Calculate the arithmetic mean and the standard deviation of the set of values :

72, 53, 61, 70, 59

[b] Represent graphically the function  $f : f(x) = x^2 - 2, x \in [-3, 3]$

From the graph deduce : 1 The vertex of the curve.

2 The equation of the axis of symmetry.

## 12 Kafr El-Sheikh Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

1 If  $X = ]-\infty, 0[$ , then  $X^c = \dots\dots\dots$

- (a)  $\mathbb{R}_+$  (b)  $[0, \infty[$  (c)  $]-\infty, 0]$  (d)  $\mathbb{R}_-$

2 The function  $f : f(x) = (x - 2)^2 - x^2$  is of the ..... degree.

- (a) first (b) second (c) third (d) fourth



## Algebra and Statistics

- 3 If  $\sum (X - \bar{X})^2 = 36$  of a set of values and the number of these values = 9 , then  $\sigma =$  .....

(a) 2 (b) 18 (c) 27 (d) 4

- 4 The middle proportional between  $3X^3$  and  $27X$  is .....

(a)  $9X^2$  (b)  $\pm 9X^4$  (c)  $\pm 9X^2$  (d)  $9X^4$

- 5 If  $y^2 + 4X^2 = 4Xy$  , then .....

(a)  $y \propto X$  (b)  $y \propto X^2$  (c)  $y \propto \frac{1}{X}$  (d)  $y \propto \frac{1}{X^2}$

- 6 If  $\{2\} \times \{X, y\} = \{(2, 4), (2, 3)\}$  , then  $X - y =$  .....

(a) 1 (b) -1 (c)  $\pm 1$  (d) zero

- 2 [a] If  $X = \{-1, 1, 2\}$  ,  $Y = \{2, 4, 6, 8\}$  and R is a relation from X to Y , where "a R b" means " $b = 2a + 4$ " for each  $a \in X$  ,  $b \in Y$  , write R and represent it by an arrow diagram , and show if R is a function or not ? If R is a function mention its range.

- [b] If  $\frac{21X - y}{7X - z} = \frac{y}{z}$  , prove that :  $y \propto z$

- 3 [a] Represent graphically the function  $f : f(X) = X^2 - 2X$  ,  $X \in [-2, 4]$  and from the graph deduce :

- 1 The equation of the line of symmetry.  
2 The maximum or the minimum value of the function.

- [b] If a , b , c and d are in continued proportion , prove that :  $\frac{a}{b+d} = \frac{c^3}{c^2d+d^3}$

- 4 [a] If  $\frac{X+y}{3} = \frac{y+z}{8} = \frac{z+X}{6}$  , prove that :  $\frac{X+y+z}{2X+3y+3z} = \frac{17}{50}$

- [b] If the point (a , 4) is one of the points of the function  $g : \mathbb{R} \longrightarrow \mathbb{R}$  where  $g(X) = 2X + b$  , then find the value of :  $6a + 3b$

- 5 [a] The following table represents the daily wages of a set of workers in a factory :

Set of wages	20 -	30 -	40 -	50 -	60 -	70 -
Number of workers	10	12	8	6	3	1

Find the mean and the standard deviation of the wages.

- [b] If the straight line which represents the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  ,  $f(X) = aX + b$  cuts from the positive part of y-axis 3 length units and passes through the point (1 , 5) , find : the value of each of a , b

# 13 El-Beheira Governorate



Answer the following questions : (Calculator is permitted)

1 Choose the correct answer from the given ones :

1 If  $3^x = 9^2$ , then  $x = \dots\dots\dots$

- (a) 3 (b) 4 (c) 6 (d) 64

2 The range of the set of the values 7, 3, 6, 8 and 5 equals  $\dots\dots\dots$

- (a) 3 (b) 8 (c) 11 (d) 5

3 If the point  $(x - 4, 2 - x)$  where  $x \in \mathbb{Z}$  is located in the third quadrant, then  $x = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 6

4 The relation which represents the direct variation between the two variables  $x$  and  $y$  is  $\dots\dots\dots$

- (a)  $xy = 7$  (b)  $y = x + 5$  (c)  $\frac{x}{3} = \frac{7}{y}$  (d)  $\frac{x}{2} = \frac{y}{5}$

5 The solution set of the equation  $x^2 - 25 = 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

- (a)  $\{5, -5\}$  (b)  $[-5, 5]$  (c) 5 (d) -5

6 If  $(3, 5) \in \{3, 6\} \times \{y, 8\}$ , then  $y = \dots\dots\dots$

- (a) 8 (b) 6 (c) 5 (d) 3

2 [a] If  $X = \{2, 3, 5\}$ ,  $Y = \{4, 6, 8, 10\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $2a = b$ " for all  $a \in X, b \in Y$

1 Write  $R$

2 Show that  $R$  is a function and find its range.

[b] If  $b$  is the middle proportional between  $a$  and  $c$ , then prove that :  $\frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c}{a}$

3 [a] If  $y \propto \frac{1}{x}$  and  $y = 9$  when  $x = 2$ , find :

1 The relation between  $y$  and  $x$

2 The value of  $y$  when  $x = 3$

[b] If  $f(x) = 5x + a$  and  $f(2) = 12$ , find : the value of  $a$

4 [a] If  $X = \{3, 4\}$ ,  $Y = \{4, 5\}$ ,  $Z = \{6, 5\}$ , find :

1  $(X - Y) \times Z$

2  $n(X \times Y)$

[b] Find the number that if subtracted thrice of it from each of the two terms of the ratio  $\frac{49}{69}$  the ratio becomes  $\frac{2}{3}$

- 5 [a]** Calculate the mean and the standard deviation of the following data :

8 , 13 , 20 , 16 , 18 , 21

- [b]** Represent graphically the function  $f$  where  $f(x) = 3 - x^2$ , where  $x \in [-3, 3]$  and from the graph deduce :

- 1** The equation of the symmetry axis. **2** The maximum value of the function.

## 14 El-Fayoum Governorate



Answer the following questions : (Using calculators is allowed)

- 1** Choose the correct answer :

- 1** If  $(x + 1, \sqrt[3]{27}) = (-1, y)$ , then the point  $(x, y)$  lies in the ..... quadrant.

(a) first (b) second (c) third (d) fourth

- 2** If  $\frac{3}{4} + \frac{3}{x} = \frac{3}{2}$ , then  $x =$  .....

(a) 2 (b) 4 (c) 3 (d)  $\frac{3}{2}$

- 3** Twice of the number  $2^8$  is .....

(a)  $2^{10}$  (b)  $2^{16}$  (c)  $2^4$  (d)  $2^9$

- 4** If  $xy = 12$ , then  $y$  varies directly as .....

(a)  $\frac{1}{x}$  (b)  $x - 12$  (c)  $x$  (d)  $x + 12$

- 5** Omar bought 4 notebooks and 3 pens, he paid 50 pounds for them. If the price of a pen is twice the price of a notebook, then the price of a notebook is ..... pounds.

(a) 4 (b) 5 (c) 10 (d) 20

- 6** If the range of the set of the values 7,  $x$ , 8, 9 and 5 is 6, then  $x =$  .....

(a) 3 (b) 4 (c) 6 (d) 12

- 2 [a]** If  $X = \{2, 5\}$ ,  $Y = \{1, 2\}$ ,  $Z = \{3\}$ , find :

- 1**  $n(X \times Y)$  **2**  $(Y \cap X) \times Z$

- [b]** If  $a = 2b$ , find the value of :  $\frac{8a + 5b}{7a - 2b}$

- 3 [a]** If  $X = \{1, 2, 3\}$ ,  $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}\}$  and  $R : X \longrightarrow Y$ , where " $a R b$ " means " $a$  is the multiplicative inverse of  $b$ " for all  $a \in X, b \in Y$

- 1** Write  $R$  and represent it by an arrow diagram

- 2** Is  $R$  a function? Write its range.

- [b]** If  $f(x) = 4x + a$ ,  $f\left(\frac{1}{4}\right) = 12$ , find : the value of  $a$



4 [a] If  $a, b, c$  and  $d$  are in continued proportion, prove that :  $\frac{a}{b+d} = \frac{c^3}{c^2 d + d^3}$

[b] If  $y$  varies inversely as  $x$ , and  $y = 3$  when  $x = 2$

1 Find the relation between  $x$  and  $y$

2 Find the value of  $y$  when  $x = 3$

5 [a] Graph the function  $f$  where  $f(x) = 4 - x^2, x \in [-3, 3]$ , from the graph determine :

1 The coordinates of the vertex of the curve.

2 The equation of the symmetry axis of this function.

[b] Calculate the mean and the standard deviation of the following data :

3, 6, 7, 9, 15

## 15 Beni Suef Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The middle proportional between  $a$  and  $c$  equals .....

(a)  $\sqrt{a+c}$

(b)  $\frac{a+c}{2}$

(c)  $\pm\sqrt{ac}$

(d)  $ac$

2 The difference between the greatest value and the smallest value of a set of data is called .....

(a) the range.

(b) the arithmetic mean.

(c) the mode.

(d) the standard deviation.

3  $|\sqrt[3]{-8}| = \dots\dots\dots$

(a) 4

(b) 2

(c) -2

(d)  $\pm 2$

4  $\frac{7}{x}$  is a rational number if  $x \neq \dots\dots\dots$

(a) 7

(b) -7

(c) 1

(d) zero

5 If the point  $(a, 3-a)$  lies on the  $x$ -axis, then  $a = \dots\dots\dots$

(a) zero

(b) 3

(c) -3

(d) 5

6 If  $-x > 3$ , then  $x \in \dots\dots\dots$

(a)  $\{-3\}$

(b)  $]3, \infty[$

(c)  $]-\infty, 3[$

(d)  $]-\infty, -3[$

2 [a] If  $X = \{2, 5\}$ ,  $Y = \{3, 2\}$ ,  $Z = \{3\}$ , find :

1  $X \times Z$

2  $Y^2$

3  $(X \cap Y) \times Z$

[b] Find the positive number which if we add its square to each of the two terms of the ratio 5 : 11 it becomes 3 : 5

- 3** [a] If  $f(x) = x^2 - \sqrt{2}x$ ,  $g(x) = x + 1$
- [1] Find :  $f(3) + 3g(\sqrt{2})$  [2] Prove that :  $f(\sqrt{2}) = g(-1)$
- [b] If  $y$  varies inversely with  $x$  and  $y = 3$  when  $x = 2$ , find :
- [1] The relation between  $x$  and  $y$  [2] The value of  $y$  when  $x = 1.5$
- 
- 4** [a] If  $X = \{1, 2, 3\}$ ,  $Y = \{6, 7, 8\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a + b = 8$ " for all  $a \in X$  and  $b \in Y$ , write  $R$  and represent it by an arrow diagram. Is  $R$  a function? Why?
- [b] If  $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$ , prove that :  $\frac{2y - z}{3x - 2y + z} = \frac{1}{2}$
- 
- 5** [a] Calculate the arithmetic mean and the standard deviation of the following values :  
7, 16, 13, 9, 5
- [b] Represent graphically the function  $f : f(x) = x^2 - 2x$  where  $x \in [-1, 3]$  and from the drawing deduce the equation of the axis of symmetry and the maximum or minimum value of the function.

## 16 El-Menia Governorate



Answer the following questions : (Calculators are allowed)

- 1** Choose the correct answer from the given ones :
- [1]  $(\sqrt{7} - \sqrt{5})(\sqrt{7} + \sqrt{5}) = \dots\dots\dots$
- (a) 2 (b) 12 (c)  $2\sqrt{7}$  (d)  $-2\sqrt{5}$
- [2] If  $xy = 3$ , then  $y \propto \dots\dots\dots$
- (a)  $x$  (b)  $x - 3$  (c)  $\frac{1}{x}$  (d)  $x + 3$
- [3]  $[1, 3] - \{0, 1\} = \dots\dots\dots$
- (a)  $]1, 3[$  (b)  $]1, 3]$  (c)  $[1, 3[$  (d)  $\{3\}$
- [4] The arithmetic mean of the set of values 8, 9, 7, 6 and 5 equals  $\dots\dots\dots$
- (a) 5 (b) 2 (c) 3 (d) 7
- [5] 20% of 10 pounds =  $\dots\dots\dots$  pounds.
- (a) 2 (b) 2.5 (c) 5 (d) 20
- [6] If the point  $(x - 4, 2 - x)$  where  $x \in \mathbb{Z}$  is located in the third quadrant, then  $x = \dots\dots\dots$
- (a) 2 (b) 3 (c) 4 (d) 6

**2 [a]** Find the standard deviation of the values : 6 , 8 , 10 , 12 and 14

**[b]** If  $X = \{2, 5\}$  ,  $Y = \{1, 2\}$  ,  $Z = \{3\}$  , find :

**1**  $n(X \times Z)$

**2**  $(Y \cap X) \times Z$

**3 [a]** If  $y \propto \frac{1}{x}$  and  $y = 3$  when  $x = 2$  , find :

**1** The relation between  $x$  and  $y$

**2** The value of  $y$  when  $x = 1.5$

**[b]** If  $X = \{1, 3, 4, 5\}$  ,  $Y = \{1, 2, 3, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a + b = 7$ " for each  $a \in X$  ,  $b \in Y$  , write  $R$  and represent it by an arrow diagram. Show if  $R$  is a function from  $X$  to  $Y$  or not. Give the reason.

**4 [a]** If  $\frac{x}{y} = \frac{2}{3}$  , find the value of the ratio :  $\frac{3x + 2y}{6y - x}$

**[b]** If the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  where  $f(x) = 4x - a$  is represented graphically by a straight line intersecting the  $x$ -axis at the point  $(2, b)$  , find :  $a, b$

**5 [a]** If  $b$  is the middle proportional between  $a$  and  $c$  , prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

**[b]** Represent graphically the following function and from the drawing deduce the coordinates of the curve , and the equation of the symmetry axis and the minimum or the maximum value of the function  $f : f(x) = x^2 - 2$  , where  $x \in [-3, 3]$

## 17 Assiut Governorate



Answer the following questions : (Calculator is allowed)

**1** Choose the correct answer :

**1**  $[2, 5] \cup \{2\} = \dots\dots\dots$

(a)  $[2, 5[$

(b)  $[2, 5[$

(c)  $] -\infty, \infty[$

(d)  $[2, 5]$

**2**  $\sqrt{10^2 - 8^2} = \dots\dots\dots$

(a) 8

(b) 6

(c) 4

(d) 2

**3** The solution set of the equation :  $x(x - 1) = 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

(a)  $\{0\}$

(b)  $\{1\}$

(c)  $\{0, 1\}$

(d)  $\emptyset$

**4** If  $3a = 8b$  , then  $a : b = \dots\dots\dots$

(a)  $-8 : 3$

(b)  $8 : 3$

(c)  $3 : 8$

(d)  $-3 : 8$

**5** If  $xy = 5$  , then  $y \propto \dots\dots\dots$

(a)  $\frac{1}{x}$

(b)  $x - 5$

(c)  $x$

(d)  $\frac{1}{y}$



6 If a regular die is thrown once, then the probability of appearance of an odd number is .....

- (a) zero (b)  $\emptyset$  (c) 1 (d)  $\frac{1}{2}$

2 [a] If  $X = \{1, 5, 6\}$ ,  $Y = \{2, 4, 5\}$ , find  $X \times Y$  and represent it by an arrow diagram.

[b] Represent graphically the quadratic function  $f : f(x) = x^2 - 1$ ,  $x \in [-2, 2]$ , from the graph deduce :

- 1 The equation of the axis of symmetry.  
2 The maximum value or the minimum value of the function.

3 [a] If  $f(x) = 4x + m$ ,  $f(3) = 15$ , find : the value of  $m$

[b] If  $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3x}$ , then find : the value of  $x$

4 [a] If  $y \propto x$ ,  $y = 3$  when  $x = 2$ , find :

- 1 The relation between  $y$ ,  $x$  2 The value of  $y$  when  $x = \frac{1}{3}$

[b] If  $b$  is the middle proportional between  $a$  and  $c$ , then prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

5 [a] If  $X = \{1, 3, 5\}$ ,  $Y = \{2, 3, 4, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a + b = 7$ " for each  $a \in X$ ,  $b \in Y$

- 1 Write  $R$  and represent it by an arrow diagram.  
2 Show if  $R$  is a function or not. If  $R$  is a function, find its range.

[b] Calculate the mean and the standard deviation for the values : 8, 9, 7, 6, 5

## 18 Souhag Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer :

- 1 The simplest dispersion measure is .....  
(a) the mean. (b) the median. (c) the range. (d) the mode.  
2 20% from 100 pounds = ..... pounds.  
(a) 5 (b) 10 (c) 15 (d) 20  
3  $[3, 7] - \{3, 7\} = \dots\dots\dots$   
(a)  $[3, 7[$  (b)  $]3, 7]$  (c)  $]3, 7[$  (d)  $[3, 7]$

4 The solution set of the equation :  $x^2 - 9 = 0$  in  $\mathbb{R}$  is .....

- (a)  $\{-3\}$       (b)  $\{3\}$       (c)  $\{-3, 3\}$       (d)  $\emptyset$

5 If  $n(X) = 5$  ,  $n(X \times Y) = 10$  , then  $n(Y) = \dots\dots\dots$

- (a) 4      (b) 3      (c) 2      (d) 1

6 The relation representing the direct variation between the two variables  $y$  and  $x$  is .....

- (a)  $xy = 5$       (b)  $y = x + 3$       (c)  $\frac{x}{3} = \frac{4}{y}$       (d)  $\frac{x}{5} = \frac{y}{2}$

2 [a] If  $\frac{x}{y} = \frac{3}{4}$  , find the value of :  $\frac{3x+y}{x+5y}$

[b] If  $X = \{1, 2, 3\}$  ,  $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a$  is the multiplicative inverse of  $b$ " for all  $a \in X$  ,  $b \in Y$  , write  $R$  and represent it by an arrow diagram. Is  $R$  a function ? Why ?

3 [a] If  $X = \{4, 5, 7\}$  ,  $R$  is a function on  $X$  and  $R = \{(a, 5), (b, 5), (4, 7)\}$  , find :

- 1 The value of  $a + b$       2 The range of the function.

[b] Represent graphically the function  $f : f(x) = 2 - x^2$  ,  $x \in [-3, 3]$  , from the graph deduce :

- 1 The coordinates of the vertex point of the curve.  
2 The equation of the axis of symmetry.  
3 The maximum value of the function.

4 [a] If  $b$  is the middle proportional between  $a$  and  $c$  , prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

[b] From the data of the following table , answer the following questions :

$x$	2	4	6
$y$	6	3	2

- 1 Show the kind of variation between  $y$  and  $x$   
2 Find the constant proportional.  
3 Find the value of  $y$  when  $x = 2\frac{2}{5}$

5 [a] If the point  $(a, 3)$  is located on the straight line which represents the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  where  $f(x) = 4x - 5$  , find : the value of  $a$

[b] Find the standard deviation of the set of the values : 15 , 19 , 20 , 21 , 25

## 19 Qena Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

- 1 The ordered pair  $(X^2, y^2)$ , where  $X \neq 0, y \neq 0$  lies in the ..... quadrant.  
 (a) first (b) second (c) third (d) fourth
- 2 The positive square root of mean of the squares of deviations of the values from their arithmetic mean is called .....  
 (a) the range. (b) the median.  
 (c) the standard deviation. (d) the mode.
- 3 If  $X$  and  $X + 17$  are two prime numbers, then  $X =$  .....  
 (a) 1 (b) 2 (c) 3 (d) 5
- 4 If  $XY = 5$ , then  $y \propto$  .....  
 (a)  $X$  (b)  $\frac{1}{X}$  (c)  $X^2$  (d)  $\frac{1}{X^2}$
- 5 If  $X = \{3\}$ , then  $n(X^2) =$  .....  
 (a) 1 (b) 9 (c)  $\{(3, 3)\}$  (d) 3
- 6 The ratio between the area of a square of side length  $l$  and the area of a square of side length  $3l$  equals .....  
 (a) 1 : 3 (b) 3 : 1 (c) 1 : 9 (d) 9 : 1

- 2 [a] If  $X = \{1, 2, 3\}$ ,  $Y = \{0, 1, 2, 3, 4\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $b - a = 1$ " for all  $a \in X, b \in Y$ , write  $R$  and represent it by an arrow diagram. Show that  $R$  is a function and write its range.

[b] If  $\frac{a}{4} = \frac{b}{5} = \frac{c}{3}$ , prove that :  $\frac{a-b+c}{a+b-c} = \frac{1}{3}$

- 3 [a] If  $y \propto X, y = \frac{5}{6}$  when  $X = \frac{1}{6}$ , write the relation between  $y$  and  $X$ , then find the value of  $X$  when  $y = 15$
- [b] If the point  $(a, -a)$  lies on the straight line that represents the function  $f : f(X) = X - 6$ , find : the value of  $a$

- 4 [a] If  $y$  is the middle proportional between  $X$  and  $z$ , prove that :  $\frac{Xz}{y(y+z)} = \frac{X}{X+y}$

[b] If  $X = \{2, 3\}, Y = \{5\}, Z = \{4, 5\}$ , find :

1  $(X - Y) \times Z$

2  $X \times (Y \cap Z)$



- 5 [a] Represent graphically the function  $f : f(x) = (x - 3)^2$ ,  $x \in [0, 6]$ ,  
from the graph find :

- 1 The vertex of the curve. 2 The maximum or minimum value of the function.

- [b] Calculate the arithmetic mean and the standard deviation for the following data :  
73 , 54 , 62 , 71 , 60

## 20 Luxor Governorate



Answer the following questions :

- 1 Choose the correct answer :

- 1  $\frac{1}{3}$  of the number  $3^4 = \dots\dots\dots$   
(a) 3 (b)  $3^2$  (c)  $3^3$  (d)  $2^3$
- 2 If  $n(X^2) = 4$ ,  $n(X \times Y) = 6$ , then  $n(Y^2) = \dots\dots\dots$   
(a) 12 (b) 9 (c) 6 (d) 3
- 3  $4, 6 \cap \{4, 6\} = \dots\dots\dots$   
(a)  $\{5\}$  (b)  $[4, 6]$  (c)  $\{4, 6\}$  (d)  $\emptyset$
- 4 If  $x, y, z$  are in continued proportion, then  $x = \dots\dots\dots$   
(a)  $\pm\sqrt{yz}$  (b)  $yz$  (c)  $\frac{y^2}{z}$  (d)  $\frac{y}{z}$
- 5  $\sqrt[3]{64} = \sqrt{\dots\dots\dots}$   
(a) 2 (b) 16 (c) 8 (d) 4
- 6 If all the values are equal, then  $\dots\dots\dots$   
(a)  $x - \bar{x} > 0$  (b)  $x - \bar{x} < 0$  (c)  $\bar{x} = 0$  (d)  $\sigma = 0$

- 2 [a] If  $X = \{2, 1\}$ ,  $Y = \{4, 0\}$ ,  $Z = \{4, 5, -2\}$ , find :

- 1  $X \times Y$  2  $(Y \cap Z) \times X$  3  $n(Y^2)$

- [b] Find the number which if subtracted from the first term of the ratio 15 : 13 and added to the second term, then it becomes 3 : 4

- 3 [a] If  $f(x) = 2x + a$ ,  $g(x) = x^2 + a$  and if  $f(2) + g(-4) = 30$ , find : the value of a

- [b] If a, b, c and d are proportional quantities, prove that :  $\frac{a+c}{b+d} = \frac{a^2+c^2}{a^2b+c^2d}$

- 4 [a] If  $X = \{0, 1, 2, \frac{1}{2}\}$  and R is a relation on X where "a R b" means

"a is the multiplicative inverse of b" for each  $a \in X$ ,  $b \in X$ , write R and represent it by an arrow diagram. Is R a function or not ?

[b] If  $y \propto x^3$  and  $y = 64$  when  $x = 2$ , find :

- [1] The relation between  $x$  and  $y$       [2] The value of  $y$  when  $x = \frac{1}{2}$

5 [a] Calculate the mean and the standard deviation for the values : 22 , 20 , 20 , 20 , 18

[b] Represent graphically the function  $f : f(x) = x^2 - 4x + 5$  where  $x \in [0, 4]$ , then from the graph find :

- [1] The equation of the axis of symmetry.  
[2] The maximum or the minimum value of the function.

## 21 Aswan Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

- [1] If  $n(X^2) = 9$  ,  $n(X \times Y) = 6$  , then  $n(Y) = \dots\dots\dots$   
 (a) 2                      (b) 3                      (c) 4                      (d) 6
- [2] If  $xy = 3$  , then  $y \propto \dots\dots\dots$   
 (a)  $3x$                       (b)  $\frac{3}{x}$                       (c)  $\frac{1}{x}$                       (d)  $\frac{x}{3}$
- [3]  $[2, 5] - \{2, 5\} = \dots\dots\dots$   
 (a)  $[1, 6]$                       (b)  $\emptyset$                       (c)  $]2, 5[$                       (d)  $\{0\}$
- [4]  $\sqrt{50} - \sqrt{8} = \dots\dots\dots$   
 (a)  $\sqrt{200}$                       (b)  $\sqrt{98}$                       (c)  $\sqrt{42}$                       (d)  $\sqrt{18}$
- [5] If  $\sum (x - \bar{x})^2 = 48$  of a set of values and the number of these values = 12 , then  $\sigma = \dots\dots\dots$   
 (a) -2                      (b) 2                      (c) 4                      (d) 6
- [6] If  $x - y = 5$  ,  $x + y = \frac{1}{5}$  , then  $x^2 - y^2 = \dots\dots\dots$   
 (a)  $\frac{1}{25}$                       (b) 1                      (c) 5                      (d) 25

2 [a] If  $X = \{1, 3, 4, 5\}$  ,  $Y = \{1, 2, 3, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a + b = 7$ " for each  $a \in X$  ,  $b \in Y$

- [1] Write  $R$  and represent it by an arrow diagram.  
[2] Is  $R$  a function ? and why ?

[b] If  $y \propto x$  and  $y = 6$  when  $x = 3$  , find :

- [1] The relation between  $x$  and  $y$       [2] The value of  $y$  when  $x = 5$

- 3 [a] Represent graphically the function  $f : f(x) = 4 - x^2$ , taking  $x \in [-3, 3]$  and from the graph deduce : the coordinates of the vertex point of the curve , the maximum value of the function and the equation of line of symmetry.

- [b] Find the positive number which if its square is added to the antecedent of the ratio  $29 : 46$  and subtracted its square from its consequent the ratio becomes  $3 : 2$

- 4 [a] If the straight line which represents the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$ ,  $f(x) = 6x - a$  intersects the y-axis at the point  $(b, 2)$ , find : the value of each of a and b

- [b] The following frequency distribution shows the marks of a number of students in an exam :

Marks	0	1	2	3	4	5	6
Number of students	3	4	6	9	5	3	4

Find the standard deviation of the marks.

- 5 [a] If  $X = \{1, 3, 5\}$  and R is a function on X where  $R = \{(a, 3), (b, 1), (1, 5)\}$ , find :

- 1 The range of the function. 2 The value of  $a + b$

- [b] If a , b , c and d are proportional quantities , prove that :  $\frac{a}{b-a} = \frac{c}{d-c}$

## 22 New Valley Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 The next in the pattern :  $\sqrt{3}, \sqrt{12}, \sqrt{27}, \sqrt{48}$  is .....

- (a)  $\sqrt{50}$  (b)  $\sqrt{75}$  (c)  $\sqrt{60}$  (d)  $\sqrt{90}$

- 2 The point  $(-3, 4)$  lies in the ..... quadrant.

- (a) first (b) second (c) third (d) fourth

- 3 If y varies inversely with x , and  $x = \sqrt{3}$  when  $y = \frac{2}{\sqrt{3}}$  , then the constant proportional equals .....

- (a)  $\frac{1}{2}$  (b)  $\frac{2}{3}$  (c) 2 (d) 6

- 4 If the point  $(a, 3)$  is located on the straight line which represents the function  $f : \mathbb{R} \longrightarrow \mathbb{R}$  where  $f(x) = 4x - 5$  , then  $a =$  .....

- (a) 2 (b) 3 (c) 4 (d) 5

- 5 ..... is one of the measures of the dispersion.

- (a) The median (b) The arithmetic mean  
(c) The standard deviation (d) The mode



## Algebra and Statistics

- 6 If  $(X + 1)^2$  is one of the linear factors of the expression  $(X^2 - 1)^2$ , then the other factor is .....
- (a)  $(X - 1)^2$       (b)  $(X - 1)$       (c)  $(X^2 + 1)$       (d)  $(X^2 - 1)$
- 
- 2 [a] If  $X = \{2, 3, 5\}$ ,  $Y = \{4, 6, 8, 10\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $2a = b$ " for all  $a \in X, b \in Y$
- 1 Write  $R$  and represent it by an arrow diagram.      2 Show that  $R$  is a function.
- [b] If  $\frac{X}{y} = \frac{2}{3}$ , find the value of the ratio :  $\frac{3X + 2y}{6y - X}$
- 
- 3 [a] If  $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$ , then find :
- 1  $X, Y$       2  $Y \times X$       3  $Y^2$
- [b] If  $\frac{21X - y}{7X - z} = \frac{y}{z}$ , then prove that :  $y \propto z$
- 
- 4 [a] If  $f(X) = 4X + b$  and  $\frac{1}{3}f(3) = 5$ , find : the value of  $b$
- [b] If  $a, b, c$  and  $d$  are in continued proportion, then prove that :  $\frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$
- 
- 5 [a] Calculate the standard deviation for the values : 12, 13, 16, 18, 21
- [b] Represent graphically the function  $f : f(X) = (X - 3)^2$ ,  $X \in [0, 6]$ , from the graph deduce the vertex of the curve, the minimum value of the function, the equation of the axis of symmetry.

## 23 South Sinai Governorate



Answer the following questions :

- 1 Choose the correct answer from the given answers :
- 1 If  $(2, 3) \in \{2, 5\} \times \{X, 4\}$ , then  $X = \dots$
- (a) 2      (b) 3      (c) 4      (d) 5
- 2 If  $Xy = 5$ , then  $y \propto \dots$
- (a)  $\frac{1}{X}$       (b)  $X$       (c)  $X - 5$       (d)  $X + 5$
- 3 ..... is one of the measures of the dispersion.
- (a) The arithmetic mean      (b) The median
- (c) The mode      (d) The standard deviation
- 4 The mean of the values 1, 2, 3, 4 and 5 equals .....
- (a) 5      (b) 4      (c) 3      (d) 2

5  $\sqrt[3]{x^6} = \sqrt{\dots\dots\dots}$

(a)  $x^4$

(b)  $x^3$

(c)  $x^2$

(d)  $x$

6 If  $\frac{5}{4} + \frac{5}{a} = \frac{5}{2}$ , then  $a = \dots\dots\dots$

(a)  $\frac{5}{2}$

(b)  $-\frac{5}{2}$

(c) 4

(d) -4

2 [a] If  $X = \{1\}$ ,  $Y = \{2, 3\}$ ,  $Z = \{2, 5, 6\}$ ,

find : 1  $X \times (Y \cap Z)$

2  $n(X \times Y)$

3  $Z - Y$

[b] Represent graphically the function  $f : f(x) = x^2 - 4$ ,  $x \in [-3, 3]$ , from the graph deduce the vertex of the curve, the minimum value of the function.

3 If  $X = \{1, 3, 4, 5\}$ ,  $Y = \{1, 2, 3, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where " $a R b$ " means " $a + b = 7$ " for all  $a \in X$ ,  $b \in Y$ , write  $R$ , and represent it by an arrow diagram and also by a Cartesian diagram. Is  $R$  a function? and why?

4 [a] If  $y \propto x$ ,  $y = 6$  when  $x = 3$ , find the value of  $y$  when  $x = 5$

[b] Find the positive number which if we add its square to each of the two terms of the ratio 5 : 11 it becomes 3 : 5

5 [a] If  $a, b, c$  and  $d$  are in continued proportion, then prove that :  $\frac{c^2 - d^2}{a - c} = \frac{b d}{a}$

[b] The following frequency distribution shows the ages of 10 children :

Ages in years	5	8	9	10	12	Total
Number of children	1	2	3	3	1	10

Calculate the standard deviation to the ages in years.

## 24 North Sinai Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from those given :

1  $\sqrt{16} + \sqrt[3]{-8} = \dots\dots\dots$

(a) -4

(b) -2

(c) 2

(d) 4

2 If  $(9, 4) \in \{9, 7\} \times \{x, 5\}$ , then  $x = \dots\dots\dots$

(a) 9

(b) 4

(c) 7

(d) 5

3 If  $x^2 - y^2 = 12$ ,  $x + y = 4$ , then  $x - y = \dots\dots\dots$

(a) -3

(b) 3

(c) 4

(d) 12

- 4 The fourth proportional of the quantities 2 , 3 , 6 equals .....
- (a) 9 (b) 3 (c) 12 (d) 18
- 5 If  $\frac{3}{4} + \frac{3}{x} = \frac{3}{2}$  , then  $x =$  .....
- (a) 2 (b) 3 (c)  $\frac{3}{2}$  (d) 4
- 6 The range of the set of the values 3 , 5 , 6 , 7 , 9 equals .....
- (a) 3 (b) 4 (c) 6 (d) 12
- 
- 2 [a] If  $X = \{2, 3, 4\}$  ,  $Y = \{2, 3, 4, 5, 6, 7, 8\}$  and R is a relation from X to Y where "a R b" means " $a = \frac{1}{2} b$ " for all  $a \in X, b \in Y$
- 1 Write R and represent it by an arrow diagram.
- 2 Show that R is a function from X to Y and find its range.
- [b] If  $y \propto x$  and  $y = 2$  when  $x = 8$  , find the value of y when  $x = 12$
- 
- 3 [a] If  $f(x) = 4x + b$  ,  $f(3) = 15$  , find : the value of b
- [b] If  $\frac{x}{y} = \frac{2}{3}$  , then find the value of :  $\frac{3x + 2y}{6y - x}$
- 
- 4 [a] If  $(6, b - 3) = (2 - a, -1)$  , find : the value of  $a + b$
- [b] If b is the middle proportional between a and c , prove that :  $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$
- 
- 5 [a] Calculate the arithmetic mean and the standard deviation of the set of the values : 23 , 12 , 17 , 13 , 15
- [b] Graph the function  $f : f(x) = 4 - x^2$  where  $x \in [-3, 3]$  and from the graph find :
- 1 The vertex of the curve. 2 The equation of the axis of symmetry.
- 3 The maximum value of the function.

25

Red Sea Governorate



Answer the following questions : (Calculators are allowed)

- 1 Choose the correct answer from those given :
- 1 The range of the set of the values 7 , 3 , 6 , 9 , 5 equals .....
- (a) 3 (b) 4 (c) 6 (d) 12
- 2 If  $x = 3$  ,  $y = 5$  , then  $y^x =$  .....
- (a) 243 (b) 125 (c) 15 (d) 8



3 The relation which represents the direct variation between the two variables  $X$  and  $y$  is .....

- (a)  $xy = 5$  (b)  $y = x + 3$  (c)  $\frac{x}{3} = \frac{4}{y}$  (d)  $\frac{x}{5} = \frac{y}{2}$

4 If  $x - y = 5$ ,  $x + y = 1$ , then  $x^2 - y^2 = \dots\dots\dots$

- (a) 5 (b) 4 (c) 25 (d)  $\frac{1}{25}$

5 If  $n(x^2) = 9$ , then  $n(x) = \dots\dots\dots$

- (a) 1 (b) 3 (c) 6 (d) 9

6  $[3, 5] - ]3, 5[ = \dots\dots\dots$

- (a)  $[3, 5[$  (b)  $\{3, 5\}$  (c)  $\{3\}$  (d)  $\{5\}$

2 [a] If  $X \times Y = \{(2, 2), (2, 5), (2, 7)\}$ , find :

- 1  $Y$  2  $X^2$

[b] If  $5a = 3b$ , find the value of :  $\frac{7a + 9b}{4a + 2b}$

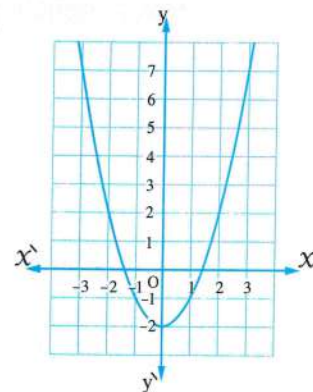
3 [a] If  $y \propto \frac{1}{x}$  and  $y = 3$  when  $x = 2$ , then find :

- 1 The relation between  $x$  and  $y$  2 The value of  $y$  when  $x = 1.5$

[b] The opposite figure represents the function  $f : f(x) = x^2 - 2$

Find :

- 1 The point of the vertex of the curve.  
2 The equation of the line of symmetry.  
3 The maximum or minimum value of the function.



4 [a] If  $X = \{-2, -1, 0, 1, 2\}$ ,  $R$  is a relation on  $X$  where " $a R b$ " means

" $a$  is the additive inverse of  $b$ " for each  $a \in X, b \in X$ , write  $R$  and represent it by an arrow diagram.

[b] If  $b$  is the middle proportional between  $a$  and  $c$ , prove that :  $\frac{a-b}{a-c} = \frac{b}{b+c}$

5 [a] Represent graphically  $f : f(x) = x - 3$ , then find the points of intersection with  $x$ -axis and  $y$ -axis.

[b] Calculate the standard deviation for the values : 8, 9, 7, 6, 5

## 1 Cairo Governorate



Answer the following questions : (Calculator is allowed)

## 1 Choose the correct answer from those given :

1 If  $\sin X = \frac{1}{2}$ , where  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots^\circ$

- (a) 30                      (b) 45                      (c) 60                      (d) 90

2 The straight line whose equation is  $y = 3X + 4$  intercepts from the positive part of y-axis a part of length  $\dots\dots\dots$  length units.

- (a) 3                      (b) 4                      (c) 5                      (d) 7

3 The measure of the exterior angle of an equilateral triangle equals  $\dots\dots\dots^\circ$

- (a) 120                      (b) 90                      (c) 60                      (d) 30

4 If  $\triangle ABC \equiv \triangle XYZ$ , then  $AB = \dots\dots\dots$

- (a) BC                      (b) YZ                      (c) XZ                      (d) XY

5 The equation of the straight line whose slope equals 1 and passes through the origin point is  $\dots\dots\dots$

- (a)  $y = X + 1$                       (b)  $X = 1$                       (c)  $y = 1$                       (d)  $y = X$

6 The angle whose measure is  $30^\circ$  supplements an angle of measure  $\dots\dots\dots^\circ$

- (a) 60                      (b) 120                      (c) 150                      (d) 180

## 2 [a] Without using calculator, prove that :

$$4 \sin 45^\circ \cos 45^\circ = 2 \text{ (showing the steps of the solution).}$$

[b] Find the equation of the straight line which passes through the point (1, 2) and is parallel to the straight line whose equation is  $y = 3X + 5$

3 [a] Find the value of  $X$  which satisfies that :

$$X \sin 30^\circ = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$$

[b] Prove that the straight line which passes through the points (0, 5), (3, 2) is perpendicular to the straight line which makes an angle of measure  $45^\circ$  with the positive direction of  $X$ -axis.

- 4 [a] ABCD is a parallelogram, M is the point of intersection of its diagonals where A (3, -1), C (1, 7) Find the coordinates of the point M
- [b] If A (2, 8), B (-1, 4) and C (3, 1) are the vertices of the triangle ABC, prove that : 1 The triangle ABC is a right-angled triangle at B  
2 The triangle ABC is an isosceles triangle.
- 5 [a] The triangle ABC is a right-angled triangle at B where AB = 7 cm. and BC = 24 cm. Find the value of : 1  $3 \tan A \times \tan C$  2  $\sin^2 A + \sin^2 C$
- [b] If the points (0, 1), (a, 3) and (2, 5) are collinear, find the value of a

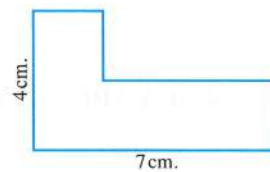
## 2

## Giza Governorate



Answer the following questions :

- 1 Choose the correct answer :
- 1 The perimeter of the opposite figure equals ..... cm.
- (a) 44 (b) 22  
(c) 18 (d) 11
- 2 If  $\angle X$ ,  $\angle Y$  are two complementary angles and  $\sin X = \frac{3}{5}$ , then  $\cos Y = \dots\dots\dots$
- (a)  $\frac{4}{5}$  (b)  $\frac{3}{5}$  (c)  $\frac{3}{4}$  (d)  $\frac{5}{3}$
- 3 ABCD is a parallelogram and  $m(\angle A) : m(\angle B) = 1 : 2$ , then  $m(\angle B) = \dots\dots\dots^\circ$
- (a) 45 (b) 135 (c) 120 (d) 115
- 4 The straight line whose equation is :  $y - 2x - 5 = 0$  cuts from the positive part of y-axis a part of length ..... length units.
- (a) 2 (b) 5 (c) 7 (d) 10
- 5 In  $\triangle ABC$ , if the angles  $\angle A$ ,  $\angle B$  are complementary, then  $m(\angle C) = \dots\dots\dots^\circ$
- (a) 45 (b) 30 (c) 90 (d) 60
- 6 The slope of the straight line which makes with the positive direction of X-axis an angle whose positive measure is  $X^\circ$  equals .....
- (a)  $\sin X$  (b)  $\cos X$  (c)  $\frac{\sin X}{\cos X}$  (d)  $\sin X + \cos X$
- 2 [a] ABCD is a trapezoid in which  $\overline{AD} \parallel \overline{BC}$ ,  $m(\angle B) = 90^\circ$  If AB = 3 cm., AD = 6 cm., BC = 10 cm., then prove that :  $\cos(\angle DCB) - \tan(\angle ACB) = \frac{1}{2}$
- [b] If the straight line  $L_1$  passes through the points (3, 1), (2, k) and the straight line  $L_2$  makes with the positive direction of X-axis an angle of measure  $45^\circ$ , then find the value of k which makes the two straight lines  $L_1$ ,  $L_2$  parallel.

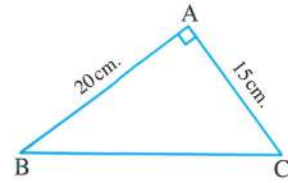




**3 [a] In the opposite figure :**

ABC is a triangle ,  $m(\angle A) = 90^\circ$  ,  $AC = 15$  cm.  
 ,  $AB = 20$  cm.

**Prove that :**  $\cos C \cos B - \sin C \sin B = 0$



**[b] ABCD is a parallelogram its diagonals intersect at M where :**

$A(3, -1)$  ,  $B(6, 2)$  ,  $C(1, 7)$

Find the coordinates of the two points M and D

**4 [a] Without using calculator , find  $m(\angle X)$  which satisfies the equation :**

$\tan X = 4 \sin 30^\circ \cos 60^\circ$  where X is a positive acute angle.

**[b] Find the equation of the straight line passing through the point  $(3, 4)$  and perpendicular to the straight line  $5x - 2y + 7 = 0$**

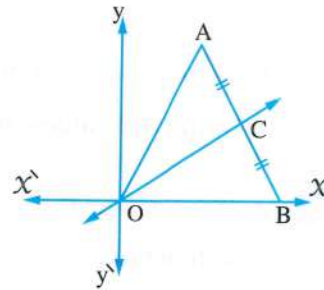
**5 [a] If the distance between the point  $(a, 7)$  and the point  $(0, 3)$  is equal to 5 length units , then find the value of a**

**[b] In the opposite figure :**

AOB is an equilateral triangle

, C is the midpoint of  $\overline{AB}$

Find the equation of  $\overrightarrow{OC}$  where O is the origin point.



**3 Alexandria Governorate**



**Answer the following questions : (Calculators are permitted)**

**1 Choose the correct answer from those given :**

**1** If C  $(6, -4)$  is the midpoint of  $\overline{AB}$  where A  $(5, -3)$  , then B is .....

- (a)  $(7, -5)$       (b)  $(-5, -7)$       (c)  $(-5, 7)$       (d)  $(11, -7)$

**2** The measure of the angle that complements an angle of measure  $60^\circ$  is ..... $^\circ$

- (a) 120      (b) zero      (c) 30      (d) 90

**3** If  $\sin \theta = 0.6$  , then  $m(\angle \theta) \simeq$  .....

- (a)  $51^\circ 33' 35''$       (b)  $36^\circ 52' 12''$       (c)  $47^\circ 15' 48''$       (d)  $45^\circ 15' 6''$

## Trigonometry and Geometry

4 The square whose area is  $100 \text{ cm}^2$ , then its diagonal length is ..... cm.

- (a) 10                      (b) 50                      (c)  $2\sqrt{10}$                       (d)  $10\sqrt{2}$

5 ABC is a right-angled triangle at B where A (1, 4), B (-1, -2)

, then the slope of  $\overrightarrow{BC}$  equals .....

- (a)  $-\frac{1}{3}$                       (b) 3                      (c)  $\frac{1}{3}$                       (d) -3

6 The sum of the lengths of any two sides of a triangle is ..... the length of the third side.

- (a) smaller than                      (b) equal to                      (c) greater than                      (d) twice

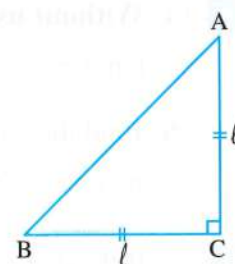
2 [a] In the opposite figure :

ABC is an isosceles triangle and right-angled at C

and the length of each of its legs is  $\ell$

Find : 1 The ratio among the lengths of the triangle  
sides AC : BC : AB

2  $\tan B$ ,  $\sin A$



[b] If the distance between the two points  $(X, 5)$ ,  $(6, 1)$  equals  $2\sqrt{5}$  length units, find the values of  $X$

3 [a] If the points A (3, 2), B (4, -3), C (-1, -2), D (-2, 3) are the vertices of a rhombus

, find : 1 The coordinates of the intersection point of its diagonals.

2 The area of the rhombus ABCD

[b] Without using calculator, find the value of  $X$  (where  $X$  is the measure of an acute angle) which satisfies :  $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$

4 [a] Find the equation of the straight line passing through the point (1, 2) and perpendicular to the straight line passing through the two points A (2, -3), B (5, -4)

[b] Prove the following equality with indicating the steps :  $\tan 60^\circ = \frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$

5 [a] If the straight line  $L_1$  passes through the two points (3, 1), (2, k) and the straight line  $L_2$  makes with the positive direction of the  $X$ -axis an angle of measure  $45^\circ$ , find the value of  $k$ , if  $L_1 \parallel L_2$

[b] Prove that the points A (-2, 5), B (3, 3), C (-4, 2) are not collinear.

## 4 El-Kalyoubia Governorate



Answer the following questions :

## 1 Choose the correct answer :

1 If  $\cos X = \frac{\sqrt{2}}{2}$  where  $X$  is the measure of an acute angle , then  $\sin 2X = \dots\dots\dots$

- (a)  $\frac{1}{\sqrt{2}}$  (b)  $-\frac{\sqrt{2}}{2}$  (c) 1 (d)  $\frac{2}{\sqrt{2}}$

2 The number of the axes of symmetry of the circle equals  $\dots\dots\dots$

- (a) zero (b) 1 (c) 2 (d) an infinite number.

3 If ABCD is a rectangle , A ( - 4 , - 1 ) , C ( 4 , 5 ) , then the length of  $\overline{BD} = \dots\dots\dots$  length units.

- (a) 10 (b) 6 (c) 5 (d) 4

4 The perpendicular length between  $X = 5$  ,  $X + 3 = 0$  equals  $\dots\dots\dots$  length units.

- (a) 2 (b) 8 (c) - 8 (d) 5

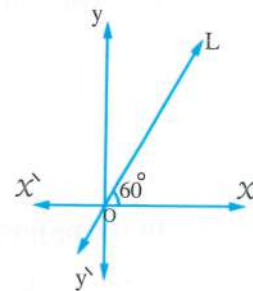
5  $\Delta ABC$  is an isosceles triangle and right-angled at C and the length of each leg is  $l$  , then  $AB : BC : CA = \dots\dots\dots$

- (a)  $1 : 1 : \sqrt{2}$  (b)  $1 : \sqrt{2} : 1$  (c)  $\sqrt{2} : 1 : 2$  (d)  $\sqrt{2} : 1 : 1$

## 6 In the opposite figure :

The equation of the straight line L is  $\dots\dots\dots$

- (a)  $X = \sqrt{3} y$  (b)  $y = \sqrt{3} X$   
(c)  $X = y$  (d)  $y = \sqrt{3}$



2 [a] Find the slope and the length of the y-intercept for the straight line :  $\frac{X}{2} + \frac{y}{3} = 1$

[b] If  $\sin X = \tan 30^\circ \sin 60^\circ$  where  $X$  is the measure of an acute angle , find :  $4 \cos X \sin X$

3 [a] Find the equation of the straight line which passes through the point ( 2 , - 5 ) and is parallel to the straight line which passes through the two points ( - 2 , 1 ) , ( 2 , 7 )

[b] ABC is a right-angled triangle at B , if  $2 AB = \sqrt{3} AC$

, find : 1  $m(\angle C)$

2  $\sin^2 A - \cos^2 C$



## Trigonometry and Geometry

- 4 [a] If the two straight lines  $L_1 : 3x - 4y - 3 = 0$  ,  $L_2 : ay + 4x - 8 = 0$  are perpendicular , find the value of  $a$

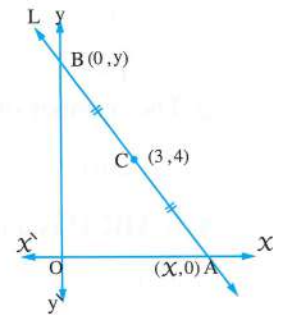
- [b] If the points  $A(3, 2)$  ,  $B(4, -3)$  ,  $C(-1, -2)$  ,  $D(-2, 3)$  are the vertices of a rhombus , find the area of the rhombus ABCD

- 5 [a] Prove that :  $\cos^2 60^\circ = \cos^2 30^\circ \tan^2 30^\circ \tan 45^\circ$

- [b] In the opposite figure :

The point C is the midpoint of  $\overline{AB}$  where  $C(3, 4)$

Find the perimeter of the triangle AOB



5

## El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- [1] In  $\triangle ABC$  , if  $m(\angle B) = 90^\circ$  , then  $\sin A + \cos C = \dots\dots\dots$

(a)  $2 \sin C$                       (b)  $2 \cos A$                       (c)  $2 \cos C$                       (d)  $\tan A$

- [2] If  $\sin 2x = \frac{1}{2}$  where  $2x$  is the measure of an acute angle , then  $x = \dots\dots\dots^\circ$

(a) 15                      (b) 60                      (c) 70                      (d) 30

- [3] In the opposite figure :

If  $AO = 8$  length units

,  $OB = 6$  length units

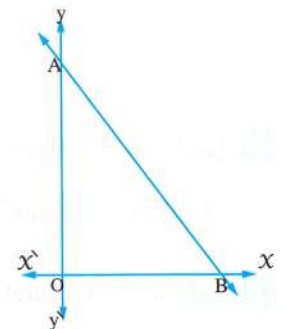
, then the equation of  $\overleftrightarrow{AB}$  is  $\dots\dots\dots$

(a)  $y = \frac{4}{3}x + 8$

(b)  $y = -\frac{4}{3}x - 8$

(c)  $y = \frac{3}{4}x - 8$

(d)  $y = -\frac{4}{3}x + 8$



- [4] The perpendicular distance between the point  $(3, -4)$  and  $x$ -axis equals  $\dots\dots\dots$  length units.

(a) 3                      (b) -4                      (c) 5                      (d) 4

5 In the square XYZL, if the slope of  $\overrightarrow{XZ} = 1$ , then the slope of  $\overrightarrow{YL} = \dots\dots\dots$

- (a) 1 (b) -1 (c)  $\pm 1$  (d)  $45^\circ$

6 ABC is a right-angled triangle at B, where  $3 AC = 5 BC$ , then  $\tan A = \dots\dots\dots$

- (a)  $\frac{3}{5}$  (b)  $\frac{5}{3}$  (c)  $\frac{3}{4}$  (d)  $\frac{4}{3}$

2 [a] If the point C (4, y) is the midpoint of  $\overline{AB}$  where A (x, 3) and B (6, 5), find the value of :  $x + y$

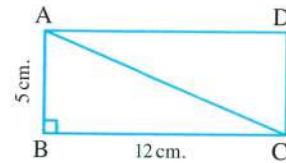
[b] Prove that the points A (5, 3), B (3, -2), C (-2, -4) are the vertices of a triangle, then prove that the triangle is an obtuse-angled triangle at B

3 [a] In the opposite figure :

If ABCD is a rectangle in which  $AB = 5$  cm.,  $BC = 12$  cm.

, find : 1 The length of  $\overline{AC}$

2 The value of :  $5 \tan (\angle ACD) - 13 \sin (\angle DAC)$



[b] If the two points A (3, -1), B (5, 3)

, find the equation of the axis of symmetry of  $\overline{AB}$

4 [a] Without using the calculator, find the value of :  $\frac{\cos^2 60^\circ + \cos^2 30^\circ}{\sin 60^\circ \tan 60^\circ}$

[b] If the two equations of the two straight lines  $L_1$  and  $L_2$  are :

$L_1 : 6x + ky - 3 = 0$  and  $L_2 : 3y = 2x + 6$  respectively.

, find the value of k which makes :

1 The two straight lines parallel.

2 The two straight lines perpendicular.

5 [a] Find the equation of the straight line which passes through the point (1, 4) and is parallel to the straight line :  $x + 2y - 4 = 0$

[b] If ABCD is a square where : A (2, 4), B (-3, 0), C (-7, 5)

, find : 1 The coordinates of the point D 2 The area of the square ABCD

## 6 El-Monofia Governorate



Answer the following questions : (Using calculator is permitted)

1 Choose the correct answer :

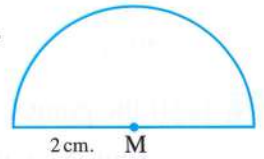
1 The surface area of a square is  $25 \text{ cm}^2$ , then the length of its diagonal is ..... cm.

- (a) 5 (b) 10 (c)  $5\sqrt{2}$  (d)  $10\sqrt{2}$

## Trigonometry and Geometry

- 2 ABC is a triangle. If  $(AC)^2 > (AB)^2 + (BC)^2$ , then  $\angle C$  is .....  
 (a) acute. (b) obtuse. (c) right. (d) straight.

- 3 The opposite figure represents a semicircle with the radius length of its circle is 2 cm. , then the perimeter of this figure = ..... cm.  
 (a)  $2\pi$  (b)  $4\pi$   
 (c)  $2\pi + 4$  (d)  $4\pi + 2$



- 4 If  $\cos \frac{X}{2} = \frac{\sqrt{3}}{2}$  where  $\frac{X}{2}$  is the measure of an acute angle, then  $\tan (X - 15^\circ) = \dots\dots\dots$

- (a)  $\sqrt{3}$  (b)  $\frac{1}{\sqrt{3}}$  (c) 1 (d)  $\frac{\sqrt{3}}{2}$

- 5 The equation of a straight line is :  $\frac{X}{2} - \frac{Y}{3} = 6$ , then it intercepts from X-axis a part of length ..... length units.

- (a) 3 (b) 12 (c) 6 (d) 18

- 6 If  $\frac{-2}{3}$ ,  $\frac{6}{k}$  are the slopes of two perpendicular straight lines, then  $k = \dots\dots\dots$

- (a) 4 (b) -9 (c) -4 (d) 9

- 2 [a] Determine the type of the triangle ABC where : A (3 , 0) , B (1 , 4) and C (-1 , 2) with respect to the lengths of its sides.

- [b] Without using calculator , prove that :  $\frac{\tan 45^\circ + \tan 30^\circ}{1 - \tan 45^\circ \tan 30^\circ} = 2 + \sqrt{3}$

- 3 [a] ABCD is a quadrilateral where A (2 , 4) , B (-3 , 0) , C (-7 , 5) and D (-2 , 9)  
 Prove that : ABCD is a square.

- [b] ABC is a right-angled triangle at C , AC = 6 cm. and BC = 8 cm.  
 Find the value of :  $\cos A \cos B - \sin A \sin B$

- 4 [a] Prove that the straight line which passes through the two points (-3 , -2) and B (4 , 5) is parallel to the straight line which makes with the positive direction of X-axis an angle its measure is  $45^\circ$

- [b] If  $\sqrt{3} \sin X \tan 30^\circ = \tan 45^\circ \cos 2X$ , find the value of X (where X is the measure of an acute angle).

- 5 [a] Find the equation of the straight line which is perpendicular to the straight line :  $3X - 4Y + 7 = 0$  and intercepts from the positive part of y-axis a part of length 4 units.

- [b] ABCD is a rectangle in which AB = 3 cm. , AC = 5 cm.

Find : 1  $m(\angle ACB)$

2 The area of the rectangle ABCD



## 7 El-Gharbia Governorate



Answer the following questions : (Calculator is allowed)

**1 Choose the correct answer :**

**1** The number of the axes of symmetry of the scalene triangle equals .....

- (a) zero                      (b) 1                      (c) 2                      (d) 3

**2** In the triangle XYZ , if  $(YZ)^2 + (XZ)^2 < (XY)^2$  , then  $\angle Z$  is .....

- (a) acute.                      (b) right.                      (c) obtuse.                      (d) straight.

**3** If the distance between the two points (a , 0) and (0 , 1) is one length unit , then a = .....

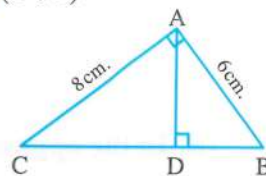
- (a) 1                      (b) - 1                      (c) 0                      (d) 2

**4** If the origin point is the midpoint of  $\overline{AB}$  where A (2 , - 3) , then the point B is .....

- (a) (- 3 , 2)                      (b) (- 2 , 3)                      (c) (- 2 , - 3)                      (d) (2 , 3)

**5** In the opposite figure : ABC is a right-angled triangle at A in which  $\overline{AD} \perp \overline{BC}$  cutting it at D , AB = 6 cm. and AC = 8 cm. , then AD = ..... cm.

- (a) 3.6                      (b) 8.4                      (c) 4.8                      (d) 6.4



**6** ABC is a right-angled triangle at B , then  $\sin A + 2 \cos C = \dots\dots\dots$

- (a)  $2 \sin C$                       (b)  $3 \sin A$                       (c)  $2 \sin A$                       (d)  $3 \cos A$

**2 [a]** XYZ is a right-angled triangle at Y in which : XY = 5 cm. and XZ = 13 cm.

Find the value of :  $\cos X \cos Z - \sin X \sin Z$

**[b]** Find the measure of the positive angle that  $\overrightarrow{AB}$  makes where :

A (3 , - 2) , B (6 , 1) with the negative direction of the X-axis.

**3 [a]** Find the value of X if :  $\cos (3X + 6^\circ) = \frac{1}{2}$  where  $(3X + 6^\circ)$  is the measure of an acute angle.

**[b]** Find the equation of the straight line which is parallel to the straight line  $\frac{y-1}{x} = \frac{1}{3}$  and intersects from the negative part of y-axis a part equals 3 length units.

**4 [a]** Find the value of X which satisfies :  $X - \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

**[b]** If the points A (- 3 , 0) , B (3 , 4) and C (1 , - 6) are the vertices of an isosceles triangle of vertex A , find the length of the drawn line segment from A perpendicular to  $\overline{BC}$

- 5 [a] If the point  $M(-1, 2)$  is the centre of the circle passing through the point  $A(3, -1)$ , find the circumference of the circle (where  $\pi = \frac{22}{7}$ )
- [b] Find the equation of the straight line passing through the point  $(1, 2)$  and perpendicular to the straight line passing through the two points  $A(2, -3)$  and  $B(5, -4)$

## 8 El-Dakahlia Governorate



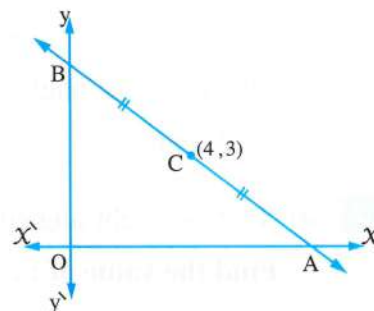
Answer the following questions : (Calculator is permitted)

- 1 [a] Choose the correct answer :
- 1 If  $m(\angle A) = 75^\circ$ ,  $\sin A = \cos B$ ,  $\angle B$  is acute, then  $m(\angle B) = \dots\dots\dots$   
 (a)  $45^\circ$  (b)  $75^\circ$  (c)  $15^\circ$  (d)  $105^\circ$
- 2 If  $ABC$  is a right-angled triangle at  $B$ ,  $AB = BC$ , then  $\tan A = \dots\dots\dots$   
 (a)  $\frac{1}{3}$  (b)  $\sqrt{3}$  (c) 1 (d)  $\frac{1}{\sqrt{2}}$
- 3 If  $\overrightarrow{AB} \perp \overrightarrow{CD}$  and the slope of  $\overrightarrow{AB} = 0$ , then the slope of  $\overrightarrow{CD} = \dots\dots\dots$   
 (a) 1 (b)  $-1$  (c) zero (d) not defined.

[b] In the opposite figure :

The point  $C$  is the midpoint of  $\overline{AB}$   
 where  $C(4, 3)$ ,  $O$  is the origin  
 point in the perpendicular coordinates system.

- Find : 1 The coordinates of the two points  $A, B$   
 2 The area of the triangle  $AOB$



- 2 [a] Choose the correct answer :
- 1 If  $\cos 3X = \frac{1}{2}$ ,  $3X$  is the measure of an acute angle, then  $X = \dots\dots\dots$   
 (a)  $20^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $60^\circ$
- 2 The radius length of the circle whose centre is  $(0, 0)$  and passes through  $(3, 4)$  equals  $\dots\dots\dots$  length units.  
 (a) 7 (b) 1 (c) 12 (d) 5
- 3 The measure of the exterior angle of the equilateral triangle equals  $\dots\dots\dots$   
 (a)  $60^\circ$  (b)  $90^\circ$  (c)  $120^\circ$  (d)  $80^\circ$
- [b] Without using calculator, find the value of  $X$  which satisfies :  
 $2 \sin X = \tan^2 60^\circ - 2 \tan 45^\circ$  where  $X$  is the measure of an acute angle.

- 3 [a] Find the equation of the straight line which intercepts from the positive parts of the two axes two parts of lengths 2 units, 3 units from  $X$  and  $y$ -axes respectively.
- [b] ABC is a right-angled triangle at C,  $AC = 5$  cm,  $BC = 12$  cm. Find the value of :  $\cos A \cos B - \sin A \sin B$
- 4 [a] ABCD is a parallelogram where A (3, 2), B (4, -5), C (0, -3). Find the coordinates of the point at which the two diagonals intersect, then find the coordinates of the point D.
- [b] Without using calculator, prove that :  $2 \sin 30^\circ + 4 \cos 60^\circ = \tan^2 60^\circ$
- 5 [a] Prove that A (5, 1), B (3, -7), C (1, 3) are not collinear points.
- [b] Find the equation of the straight line perpendicular to  $\overline{AB}$  from its midpoint where A (2, 1), B (4, 5)

## 9 Ismailia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :
- 1 The parallelogram whose two diagonals are equal in length and perpendicular is the .....  
 (a) rectangle. (b) rhombus. (c) square. (d) trapezium.
- 2 If C is the midpoint of  $\overline{AB}$  where A (-3, 6), B (3, -6), then C = .....  
 (a) (6, -6) (b) (0, 0) (c) (3, 3) (d) (-3, 0)
- 3 The number of diagonals of the triangle equals .....  
 (a) 3 (b) 2 (c) 1 (d) 0
- 4 ABC is a triangle in which  $m(\angle A) = 75^\circ$ ,  $\sin B = \cos B$ , then  $m(\angle C) = \dots\dots\dots^\circ$   
 (a) 90 (b) 60 (c) 45 (d) 30
- 5 If the ratio between the measures of two adjacent supplementary angles is 1 : 2, then the measure of the greater angle equals .....  
 (a) 120 (b) 90 (c) 180 (d) 60
- 6 The equation of the straight line which passes through the origin point and its slope = 3 is .....  
 (a)  $y = x$  (b)  $y = 3$  (c)  $x = 3$  (d)  $y = 3x$

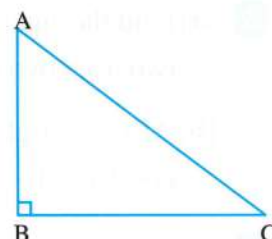


**2 [a] In the opposite figure :**

ABC is a right-angled triangle at B

**Prove that :**  $\sin^2 A + \sin^2 C = 1$

- [b]** Prove that the straight line which passes through the two points  $(-1, 3)$ ,  $(2, 4)$  is parallel to the straight line whose equation is  $3y - x - 1 = 0$


**3 [a] In the opposite figure :**

ABCD is a rectangle,  $AB = 15$  cm.,  $AC = 25$  cm.

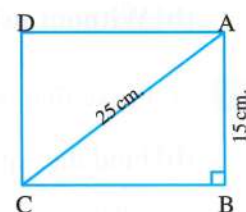
**Find :**  $m(\angle ACB)$  in degree measure

, **then find** the area of the rectangle ABCD

- [b]** The opposite table shows a linear relation.

**Find :** **[1]** The equation of the straight line.

**[2]** The length of the intercepted part from y-axis.



$x$	1	2	3
$y$	1	3	5

**4 [a] Prove that the quadrilateral ABCD whose vertices are**

$A(-1, 3)$ ,  $B(5, 1)$ ,  $C(7, 4)$  and  $D(1, 6)$  is a parallelogram.

- [b]** Find the slope of the straight line which intersects from the positive parts of two coordinates  $x$ -axis and  $y$ -axis two parts of lengths 3 units, 4 units respectively, then find the equation of this straight line.

**5 [a] Without using calculator, find the value of :  $\sin 45^\circ \cos 45^\circ + \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ$** 
**[b] In the opposite figure :**

A represents the location of Ahmed's house

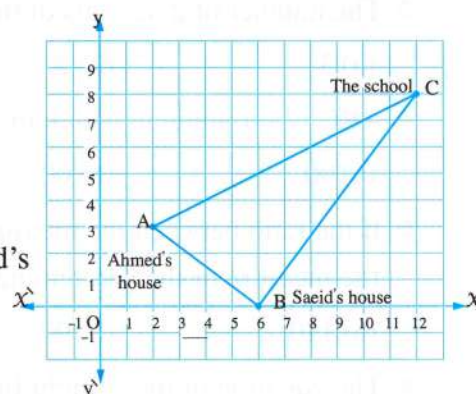
, B represents the location of Saeid's house

, C represents the location of the School.

- [1]** Which is nearer (closer) to the school : Ahmed's house or Saeid's house ? Why ?

Without measuring.

- [2]** Are the two roads  $\overline{AB}$  and  $\overline{BC}$  perpendicular ? giving reason, without measuring.



## 10 Suez Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1 If  $\sin 30^\circ = \cos \theta$  where  $\theta$  is an acute angle , then  $m(\angle \theta) = \dots\dots\dots^\circ$   
 (a) 15 (b) 30 (c) 60 (d) 90
- 2 ABC is a triangle in which :  $(AB)^2 > (BC)^2 + (AC)^2$  , then  $\angle C$  is .....  
 (a) acute. (b) obtuse. (c) right. (d) reflex.
- 3 If A ( - 2 , 5 ) , B ( 2 , - 5 ) , then the midpoint of  $\overline{AB}$  is .....  
 (a) ( 0 , 0 ) (b) ( 2 , 5 ) (c) ( 5 , 2 ) (d) ( - 5 , - 2 )
- 4 If  $\overleftrightarrow{XY}$  is the axis of symmetry of  $\overline{AB}$  , then  $XA \dots\dots\dots XB$   
 (a) > (b) < (c) = (d)  $\leq$
- 5 If  $m_1$  ,  $m_2$  are the slopes of two perpendicular straight lines , then  $m_1 \times m_2 = \dots\dots\dots$   
 (a) - 1 (b) zero (c) 1 (d) 2
- 6 The surface area of the rhombus ABCD = .....  
 (a)  $\frac{1}{2} AB \times DC$  (b)  $\frac{1}{2} AC \times BD$  (c)  $\frac{1}{2} AB \times AD$  (d)  $\frac{1}{2} AD \times BC$

- 2 [a] Find the equation of the straight line whose slope is 2 and intersects from the positive part of the y-axis a part equals 7 units.

[b] Find the value of  $X$  if :  $4X = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$

- 3 [a] ABCD is a parallelogram whose diagonals intersect at E  
 If A ( 4 , 3 ) , B ( 0 , 2 ) , C ( - 2 , - 3 ) , then find the coordinates of E , D

[b] Without using calculator , prove that :

$$\tan^2 60^\circ - \tan^2 45^\circ = \sin^2 60^\circ + \cos^2 60^\circ + 2 \sin 30^\circ$$

- 4 [a] Prove that the straight line passing through the two points ( 2 , - 1 ) , ( 6 , 3 ) is parallel to the straight line that makes with the positive direction of the  $X$ -axis an angle of measure  $45^\circ$

[b] ABC is a right-angled triangle at B , if  $2AB = \sqrt{3}AC$   
 , find :  $\sin C$  ,  $\tan A$

- 5 [a] Prove that the points A ( - 3 , 0 ) , B ( 3 , 4 ) , C ( 1 , - 6 ) are the vertices of an isosceles triangle of vertex A

[b] Find the equation of the straight line which passes through the point ( 3 , 5 ) and is perpendicular to the straight line whose slope equals  $-\frac{1}{2}$



Answer the following questions :

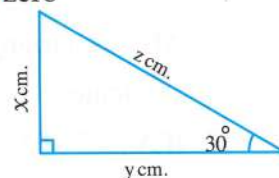
1 Choose the correct answer from those given :

1 The product of multiplying the slopes of two perpendicular straight lines equals .....

- (a) 1 (b) -1 (c)  $\pm 1$  (d) zero

2 In the opposite figure :

- (a)  $x + y = \frac{1}{2} z$  (b)  $z = x^2 + y^2$   
(c)  $x = \frac{1}{2} z$  (d)  $2y = z$



3  $\sin 30^\circ = \cos$  .....

- (a)  $10^\circ$  (b)  $45^\circ$  (c)  $30^\circ$  (d)  $60^\circ$

4  $\tan 45^\circ =$  .....

- (a) 1 (b)  $2\sqrt{2}$  (c)  $\frac{1}{2}$  (d)  $\sqrt{2}$

5 If A (5, 7) , B (1, -1) , then the midpoint of  $\overline{AB}$  is .....

- (a) (2, 3) (b) (3, 3) (c) (3, 2) (d) (3, 4)

6 If  $\overrightarrow{AB} \parallel \overrightarrow{CD}$  and the slope of  $\overrightarrow{AB} = \frac{2}{3}$  , then the slope of  $\overrightarrow{CD} =$  .....

- (a)  $\frac{3}{2}$  (b)  $-\frac{3}{2}$  (c)  $-\frac{2}{3}$  (d)  $\frac{2}{3}$

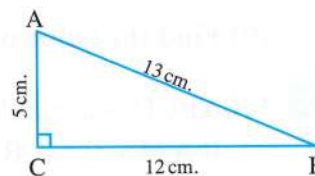
2 [a] In the opposite figure :

ABC is a right-angled triangle at C

, AB = 13 cm. , BC = 12 cm. , AC = 5 cm.

1 Prove that :  $\sin A \cos B + \cos A \sin B = 1$

2 Find :  $1 + \tan^2 A$



[b] Find the value of the following :  $\sin 45^\circ \cos 45^\circ + \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ$

3 [a] Find m ( $\angle E$ ) , where  $\angle E$  is an acute angle :  $\sin E = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$

[b] Prove that the straight line passing through the two points (-3, -2) , (4, 5) is parallel to the straight line that makes with the positive direction of the X-axis an angle of measure  $45^\circ$

4 [a] Find the equation of the straight line passing through the point (1, 2) and perpendicular to the straight line passing through the two points A (2, -3) , B (5, -4)

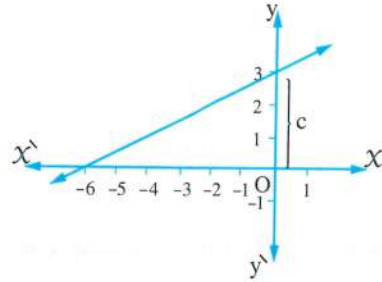
[b] Prove that the points A (3, -1) , B (-4, 6) and C (2, -2) are located on the circle whose centre is the point M (-1, 2)



- 5 [a] ABCD is a parallelogram where A (3, 2), B (4, -5), C (0, -3), find the coordinates of the point at which the two diagonals intersect, then find the coordinates of the point D

[b] Using the opposite figure, find the following :

- 1 The length of the y-intercept (c)
- 2 The length of the x-intercept.
- 3 The slope of the straight line (m)



## 12 Damietta Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from the given answers :

- 1 If the lengths of two sides of an isosceles triangle are 2 cm. and 5 cm. , then the length of the third side is ..... cm.

(a) 2 (b) 3 (c) 5 (d) 7

- 2 If  $\sin X = \frac{1}{2}$ , X is the measure of an acute angle, then  $\sin 2X = \dots\dots\dots$

(a)  $\frac{\sqrt{3}}{3}$  (b)  $\frac{\sqrt{3}}{2}$  (c)  $\frac{\sqrt{2}}{2}$  (d) 1

- 3 The surface area of the square is equal to the square of the length of the diagonal divided by .....

(a) 1 (b) 2 (c) 3 (d) 4

- 4 The equation of the straight line which passes through the point (-2, 5) and is parallel to X-axis is .....

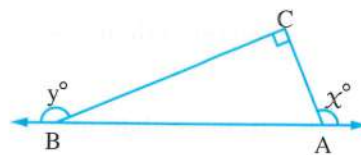
(a)  $X = -2$  (b)  $X = 5$  (c)  $y = -2$  (d)  $y = 5$

5 In the opposite figure :

$A \in \overleftrightarrow{AB}$ ,  $B \in \overleftrightarrow{AB}$ ,  $m(\angle C) = 90^\circ$

, then  $X + y = \dots\dots\dots$

(a)  $90^\circ$  (b)  $180^\circ$  (c)  $270^\circ$  (d)  $360^\circ$



- 6 If  $\overleftrightarrow{AB}$ ,  $\overleftrightarrow{DC}$  are parallel, their slopes are  $m_1$ ,  $m_2$ , then .....

(a)  $m_1 = -m_2$  (b)  $m_1 - m_2 \approx 0$  (c)  $m_1 m_2 = -1$  (d)  $m_1 m_2 = 1$

- 2 [a] ABC is a right-angled triangle at C, AC = 6 cm. , BC = 8 cm.

Find :  $\cos A \cos B - \sin A \sin B$

## Trigonometry and Geometry

- [b] Find the equation of the straight line which intercepts from the positive parts of the two axes two parts of lengths 3 units and 2 units for  $x$  and  $y$  axes respectively and find its slope.
- 3 [a] If the distance of the point  $(x, 5)$  from the point  $(6, 1)$  equals  $2\sqrt{5}$  length units, then find the value of  $x$
- [b] Find the equation of the straight line which passes through the points  $(2, -1)$ ,  $(1, 1)$  and if the point  $(0, k) \in$  the straight line, find the value of  $k$
- 4 [a] Find the value of  $x$  if :  $4x = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$  (Indicating the steps of the solution)
- [b] If the straight line passing through the two points  $(a, 0)$ ,  $(0, 3)$  is perpendicular to the straight line that makes an angle of measure  $30^\circ$  with the positive direction of the  $x$ -axis find  $a$ .
- 5 [a] Prove that :  $\sin 45^\circ \cos 45^\circ + \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ = 0$  (Indicating the steps of the solution)
- [b] Find the equation of the straight line perpendicular to  $\overline{AB}$  from its midpoint  $C$  where  $A(1, 3)$  and  $B(3, 5)$

## 13 Kafr El-Sheikh Governorate



Answer the following questions : (Calculators are permitted)

- 1 Choose the correct answer from those given :
- 1 In  $\triangle ABC$ , if  $m(\angle A) = 60^\circ$ ,  $\sin B = \cos B$ , then  $m(\angle C) = \dots\dots\dots$   
 (a)  $30^\circ$  (b)  $75^\circ$  (c)  $90^\circ$  (d)  $105^\circ$
- 2 The area of the triangle bounded by the straight lines :  $x = 0$ ,  $y = 0$ ,  $5x + 2y = 10$  is  $\dots\dots\dots$  square units.  
 (a) 10 (b) 8 (c) 7 (d) 5
- 3 If the straight line passing through the two points  $(\sqrt{3}, 1)$ ,  $(2\sqrt{3}, y)$  its slope equals  $\tan 60^\circ$ , then  $y = \dots\dots\dots$   
 (a) 2 (b) 3 (c) 4 (d) 5
- 4 If the straight line  $ax + (2 - a)y = 5$  is parallel to the straight line passing through the two points  $(1, 4)$ ,  $(3, 5)$ , then  $a = \dots\dots\dots$   
 (a) 3 (b)  $-2$  (c) 1 (d) zero
- 5 If the point  $(l - 3, 2)$  is in the first quadrant, then  $l$  can be equal to  $\dots\dots\dots$   
 (a)  $-3$  (b) 2 (c) 7 (d) zero
- 6 The complement of the angle whose measure is  $65^\circ$  is of measure  $\dots\dots\dots$   
 (a)  $35^\circ$  (b)  $25^\circ$  (c)  $115^\circ$  (d)  $45^\circ$

- 2 [a] ABC is a right-angled triangle at B , AC = 13 cm. , BC = 12 cm.

Prove that :  $\sin^2 C + \sin^2 A = 1$

- [b] If the point A (5 , 2) lies on the circle of centre M (1 , - 1) , then find :

- 1 The surface area of the circle in terms of  $\pi$
- 2 The equation of the straight line which passes through A and M

- 3 [a] If A (- 3 , 5) , B (- 1 , 7) , find the equation of the axis of symmetry of  $\overline{AB}$

- [b] Without using the calculator , prove that :

$$\tan^2 60^\circ - \tan^2 45^\circ = \sin^2 60^\circ + \cos^2 60^\circ + 2 \sin 30^\circ$$

- 4 [a] Prove that the points A (- 1 , 3) , B (5 , 1) , C (7 , 4) , D (1 , 6) are the vertices of the parallelogram ABCD

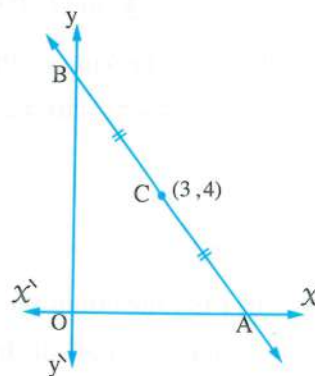
- [b] ABCD is an isosceles trapezoid in which  $\overline{AD} \parallel \overline{BC}$  , AD = 4 cm. , AB = 5 cm. , BC = 12 cm. , then calculate :  $\frac{\tan B \cos C}{\cos^2 C + \sin^2 C}$

- 5 [a] If the straight line  $L_1$  passes through the two points (3 , 1) , (2 , k) and the straight line  $L_2$  makes with the positive direction of X-axis an angle of measure  $45^\circ$  , find the value of k if : 1  $L_1 \parallel L_2$  2  $L_1 \perp L_2$

- [b] In the opposite figure :

The point C is the midpoint of  $\overline{AB}$   
where C (3 , 4) , O is the origin point of the perpendicular coordinates system.

- Find : 1 The coordinates of the two points A and B  
2 The equation of  $\overline{AB}$



## 14 El-Beheira Governorate



Answer the following questions : (Calculator is permitted)

- 1 Choose the correct answer from the given ones :

- 1 If A (5 , 7) and B (1 , - 1) , then the midpoint of  $\overline{AB}$  is .....  
(a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)
- 2 If  $m(\angle B) = 80^\circ$  , then  $m(\text{reflex } \angle B) = \dots\dots\dots$   
(a)  $10^\circ$  (b)  $100^\circ$  (c)  $80^\circ$  (d)  $280^\circ$



## Trigonometry and Geometry

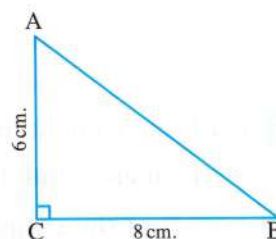
- 3 The slope of the straight line which is parallel to the straight line passing through the two points  $(2, 3)$ ,  $(-2, 4)$  equals .....
- (a)  $-1$  (b)  $-\frac{1}{4}$  (c)  $\frac{1}{4}$  (d)  $1$
- 4 If  $\tan(X + 10^\circ) = \sqrt{3}$  where  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots$
- (a)  $30^\circ$  (b)  $45^\circ$  (c)  $50^\circ$  (d)  $60^\circ$
- 5 In a parallelogram, the two diagonals are .....
- (a) perpendicular. (b) equal in length.  
(c) equal in length and perpendicular. (d) bisecting each other.
- 6 The triangle whose sides lengths are  $2$  cm.,  $(X + 2)$  cm. and  $5$  cm. becomes an isosceles triangle when  $X = \dots\dots\dots$
- (a) zero (b)  $2$  (c)  $3$  (d)  $5$

**2 [a] In the opposite figure :**

ABC is a right-angled triangle  
at C, AC = 6 cm., BC = 8 cm.

**Find :** 1  $\cos A \cos B - \sin A \sin B$

2  $m(\angle B)$



- [b] State the kind of the triangle whose vertices are the points A  $(-2, 4)$ , B  $(3, -1)$ , C  $(4, 5)$  with respect to its sides.
- 
- 3 [a] Without using the calculator, prove that :
- $$\tan^2 60^\circ - \tan^2 45^\circ = \cos^2 30^\circ + \cos^2 60^\circ + 2 \sin 30^\circ$$
- [b] Find the equation of the straight line whose slope equals 2 and intersects from the negative part of the y-axis a part equals 3 units and draw it.
- 
- 4 [a] Find the value of  $X$  which satisfies :  $X \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$
- [b] If the straight line  $L_1$  passes through the two points  $(3, 1)$ ,  $(2, k)$  and the straight line  $L_2$  makes with the positive direction of the  $X$ -axis an angle of measure  $45^\circ$ , find the value of  $k$ , if  $L_1 \parallel L_2$
- 
- 5 [a] If the point  $(3, 1)$  is the midpoint of  $\overline{AB}$  where A  $(1, y)$  and B  $(X, 3)$ , find the point  $(X, y)$
- [b] Find the equation of the straight line passing through the point  $(3, -5)$  and perpendicular to the straight line :  $X + 2y - 7 = 0$

## 15 El-Fayoum Governorate



Answer the following questions : (Using calculators is allowed)

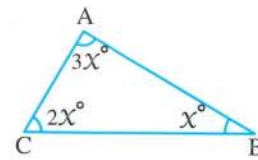
## 1 Choose the correct answer :

- 1 If  $\tan 3X = \sqrt{3}$  where  $X$  is the measure of an acute angle , then  $X = \dots\dots\dots^\circ$   
 (a) 10 (b) 15 (c) 20 (d) 30
- 2 If the perimeter of a square is 16 cm. , then its area is  $\dots\dots\dots \text{cm}^2$   
 (a) 4 (b) 16 (c) 60 (d) 90
- 3 The perpendicular distance between the two straight lines :  $X - 2 = 0$  ,  $X + 3 = 0$  equals  $\dots\dots\dots$  length units.  
 (a) 1 (b) 5 (c) 2 (d) 3

## 4 In the opposite figure :

$\triangle ABC$  is  $\dots\dots\dots$  triangle.

- (a) an isosceles. (b) an equilateral.  
 (c) an obtuse-angled. (d) a right-angled.



## 5 The area of the triangle identified by the straight lines :

$3X - 4y = 12$  ,  $X = 0$  ,  $y = 0$  equals  $\dots\dots\dots$  square units.

- (a) 6 (b) 7 (c) 12 (d) 5

6 The measure of the angle of the regular hexagon is  $\dots\dots\dots$ 

- (a)  $108^\circ$  (b)  $90^\circ$  (c)  $120^\circ$  (d)  $60^\circ$

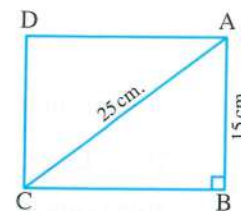
## 2 [a] In the opposite figure :

ABCD is a rectangle in which  $AB = 15 \text{ cm}$ .

,  $AC = 25 \text{ cm}$ .

Find : 1  $m(\angle ACB)$

2 The surface area of the rectangle ABCD



- [b] If the distance between the two points  $(a, 7)$  ,  $(-2, 3)$  equals 5 length units , find the values of a

3 [a] Without using the calculator , find the value of  $X$  (where  $X$  is the measure of an acute angle) which satisfies :

$$2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$$

- [b] Prove that the straight line passing through the two points  $(-1, 3)$  ,  $(2, 4)$  is parallel to the straight line  $3y - X - 1 = 0$

- 4 [a] ABCD is a quadrilateral, where A (5, 3), B (6, -2), C (1, -1), D (0, 4).  
**Prove that :** ABCD is a rhombus.

- [b] If A (5, -6), B (3, 7) and C (1, -3), find the equation of the straight line passing through the point A and the midpoint of  $\overline{BC}$

- 5 [a] **Without using the calculator, prove that :**

$$\frac{\cos^2 60^\circ + \cos^2 30^\circ + \tan^2 45^\circ}{\sin 60^\circ \tan 60^\circ - \sin 30^\circ} = 2$$

- [b] If the straight line  $L_1$  passes through the two points A (3, 1), B (2, y) and the straight line  $L_2$  makes an angle whose measure is  $45^\circ$  with the positive direction of X-axis, then find the value of y if  $L_1 \perp L_2$

## 16 Beni Suef Governorate



**Answer the following questions : (Calculator is allowed)**

- 1 **Choose the correct answer from those given :**

- 1 The product of multiplying the slopes of two perpendicular straight lines equals .....  
 (a) zero (b) 1 (c) -1 (d)  $\frac{1}{2}$

- 2 If  $\overline{AB}$  is a diameter in a circle of centre M, where A (2, 4) and B (-2, 0),  
 then M = .....

- (a) (0, 2) (b) (2, 0) (c) (0, 0) (d) (2, 2)

- 3 The quadrilateral whose diagonals are equal in length and perpendicular is the .....

- (a) parallelogram. (b) rhombus. (c) rectangle. (d) square.

- 4 If the lengths of two sides of a triangle are 2 cm. and 5 cm., then the length of the third side  $\in$  .....

- (a) ]2, 5[ (b) ]3, 7[ (c) ]2, 7[ (d) ]3, 5[

- 5 **In the opposite figure :**

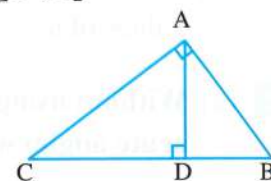
If  $m(\angle BAC) = 90^\circ$ ,  $\overline{AD} \perp \overline{BC}$

, then  $(AD)^2 =$  .....

- (a)  $AB \times AC$  (b)  $DB \times DC$  (c)  $BD \times BC$  (d)  $(AB)^2 + (BD)^2$

- 6 If  $\tan(X + 15^\circ) = 1$ , where X is the measure of an acute angle, then X = .....

- (a)  $60^\circ$  (b)  $45^\circ$  (c)  $30^\circ$  (d)  $15^\circ$





- 2 [a] Find the area of the rectangle ABCD where A  $(-1, 3)$  , B  $(5, 1)$  , C  $(6, 4)$  and D  $(0, 6)$

[b] Find the value of  $X$  if :  $X \cos 60^\circ = \sin 30^\circ + \tan 45^\circ$

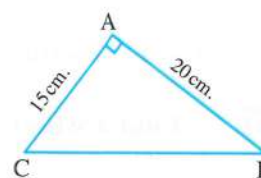
- 3 [a] Prove that the straight line passing through the two points  $(-1, 0)$  and  $(3, 4)$  is parallel to the straight line that makes a positive angle of measure  $45^\circ$  with the positive direction of the  $X$ -axis.

[b] In the opposite figure :

ABC is a right-angled triangle at A

, AB = 20 cm. and AC = 15 cm.

Prove that :  $\cos C \cos B - \sin C \sin B = \text{zero}$



- 4 [a] If C  $(X, -3)$  is the midpoint of  $\overline{AB}$  where A  $(-3, y)$  , B  $(9, 11)$  , find the value of :  $X + y$

[b] Without using the calculator , find the value of the expression :  
 $\sin 45^\circ \cos 45^\circ + 3 \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ$

- 5 [a] Find the equation of the straight line passing through the point  $(2, -5)$  and perpendicular to the straight line whose equation is  $y - 2X + 7 = \text{zero}$

[b] Prove that the points A  $(2, 3)$  , B  $(6, 2)$  , C  $(0, -1)$  and D  $(-2, 1)$  are the vertices of a trapezoid.

## 17 El-Menia Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

- 1 The measure of the exterior angle of the equilateral triangle equals .....  
 (a)  $60^\circ$  (b)  $90^\circ$  (c)  $120^\circ$  (d)  $180^\circ$
- 2 If  $L_1$  ,  $L_2$  are two lines parallel and their slopes are  $-\frac{2}{3}$  ,  $\frac{k}{6}$  , then  $k =$  .....  
 (a)  $-12$  (b)  $-9$  (c)  $4$  (d)  $-4$
- 3 The lengths of two sides of an isosceles triangle equal 2 cm. , 5 cm. , then the length of the third side equals ..... cm.  
 (a) 5 (b) 2 (c) 3 (d) 7
- 4 The distance between the point  $(5, 12)$  and the point of origin equals ..... units.  
 (a) 5 (b) 13 (c) 12 (d)  $\sqrt{17}$

## Trigonometry and Geometry

- 5 The area of the square whose perimeter is 16 cm. equals .....  $\text{cm}^2$   
 (a) 4 (b) 8 (c) 16 (d) 256
- 6 XYZ is an isosceles triangle right-angled at Z, then  $\tan X =$  .....  
 (a)  $\frac{1}{\sqrt{3}}$  (b)  $\sqrt{3}$  (c) 1 (d)  $\frac{1}{3}$
- 
- 2 [a] Prove that the triangle whose vertices are A (6, 0), B (2, -4), C (-4, 2) is right-angled at B  
 [b] XYZ is a right-angled triangle at Z where  $XZ = 7$  cm. Find the value of :  $\tan X \times \tan Y$
- 
- 3 [a] Find X where :  $4X = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$   
 [b] Find the equation of the straight line passing through the point (3, -5) and parallel to the straight line  $X + 2y - 7 = 0$
- 
- 4 [a] ABCD is a parallelogram, A (-2, 5), B (3, 3), C (-4, 2) Find the two coordinates of the point at which the two diagonals intersect, then find the coordinates of the point D.  
 [b] Without using the calculator, prove that :  $\sin^2 30^\circ = 5 \cos^2 60^\circ - \tan^2 45^\circ$
- 
- 5 [a] If the straight line  $L_1$  passes through the two points (3, 1), (2, k) and the straight line  $L_2$  makes with the positive direction of the X-axis an angle whose measure is  $45^\circ$ , then find k, if the two straight lines  $L_1, L_2$  are perpendicular.  
 [b] Find the equation of the straight line which intersects from the positive parts of X and y axes two parts of lengths 2 units, 3 units respectively.

## 18 Assiut Governorate



Answer the following questions : (Calculator is permitted)

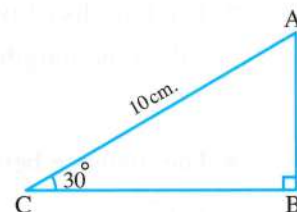
### 1 Choose the correct answer :

- 1 The sum of the measures of the interior angles of a triangle equals .....  
 (a)  $90^\circ$  (b)  $180^\circ$  (c)  $360^\circ$  (d)  $540^\circ$

### 2 In the opposite figure :

AB = ..... cm.

- (a) 5 (b) 15  
 (c) 20 (d) 40



- 3 The measure of the interior angle of a regular hexagon equals .....
- (a)  $108^\circ$  (b)  $120^\circ$  (c)  $90^\circ$  (d)  $180^\circ$
- 4 If  $2 \sin X = 1$  (where  $X$  is the measure of an acute angle), then  $X = \dots\dots\dots$
- (a)  $45^\circ$  (b)  $90^\circ$  (c)  $30^\circ$  (d)  $60^\circ$
- 5 The equation of the straight line which passes through the point  $(2, -3)$  and is parallel to  $X$ -axis is .....
- (a)  $X = 2$  (b)  $y = -3$  (c)  $X = -2$  (d)  $y = 3$
- 6 If the origin point is the midpoint of  $\overline{AB}$ ,  $A(5, -2)$ , then  $B = \dots\dots\dots$
- (a)  $(5, 2)$  (b)  $(-5, -2)$  (c)  $(-5, 2)$  (d)  $(0, 0)$

- 2 [a] Prove that the points  $A(-3, -1)$ ,  $B(6, 5)$  and  $C(3, 3)$  are collinear.

[b] Find the value of  $X$  that satisfies :  $X \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

- 3 [a] If the triangle whose vertices are  $Y(4, 2)$ ,  $X(3, 5)$  and  $Z(-5, a)$  is right-angled at  $Y$ , then find the value of  $a$

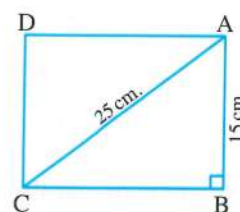
[b] Find the equation of the straight line whose slope is 2 and intersects from the positive part of the  $y$ -axis a part that equals 7 units.

- 4 [a] In the opposite figure :

ABCD is a rectangle in which  $AB = 15$  cm.  
and  $AC = 25$  cm.

Find : 1  $m(\angle ACB)$

2 The surface area of the rectangle ABCD



[b] Prove that the straight line which passes through the points  $(2, 3)$ ,  $(0, 0)$  is parallel to the straight line which passes through  $(-1, 4)$ ,  $(1, 7)$

- 5 [a] ABCD is a quadrilateral, where  $A(5, 3)$ ,  $B(6, -2)$ ,  $C(1, -1)$  and  $D(0, 4)$   
Prove that : ABCD is a rhombus.

[b] Find the slope and the intercepted part of  $y$ -axis by the straight line :

$$2X - 3y - 6 = 0$$



**19** Souhag Governorate



Answer the following questions : (Calculator is permitted)

**1** Choose the correct answer :

- 1** If  $\sin \frac{X}{2} = \frac{1}{2}$ ,  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots^\circ$   
 (a) 30 (b) 60 (c) 10 (d) 90

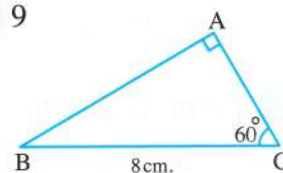
- 2** The perimeter of the square whose surface area is  $100 \text{ cm}^2$  equals  $\dots\dots\dots \text{ cm}$ .  
 (a) 10 (b) 20 (c) 40 (d) 50

- 3** If  $-\frac{2}{3}$ ,  $\frac{6}{k}$  are the slopes of two perpendicular straight lines, then  $k = \dots\dots\dots$   
 (a) 4 (b) -9 (c) -4 (d) 9

**4** In the opposite figure :

The length of  $\overline{AC} = \dots\dots\dots \text{ cm}$ .

- (a) 2 (b) 6  
 (c) 4 (d) 8



- 5** The equation of the straight line passing through the origin point and its slope = 1 is  $\dots\dots\dots$   
 (a)  $y = X$  (b)  $y = -X$  (c)  $y = 2X$  (d)  $y = 0$

- 6** If the numbers 3, 7,  $l$  are lengths of sides of a triangle, then  $l$  can be equal to  $\dots\dots\dots$   
 (a) 3 (b) 7 (c) 4 (d) 10

- 2** [a] If the midpoint of  $\overline{BC}$  is A (2, 3) and C (-1, 3), find the point B

- [b] If  $\cos X = \sin 30^\circ \cos 60^\circ$ , find :

- 1** The measure of  $\angle X$  (where  $X$  is an acute angle)  
**2**  $\tan X$

- 3** [a] If the straight line whose equation is :  $aX + 2y - 7 = 0$  is parallel to the straight line which makes an angle of measure  $45^\circ$  with the positive direction of  $X$ -axis, find the value of  $a$

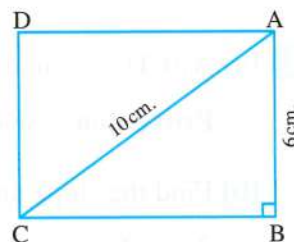
- [b] Without using calculator, prove that :  $\tan^2 60^\circ - \tan^2 45^\circ = 4 \sin 30^\circ$

**4** [a] In the opposite figure :

ABCD is a rectangle where  $AB = 6 \text{ cm}$ ,  $AC = 10 \text{ cm}$ .

Find : **1**  $m(\angle ACB)$

- 2** The surface area of the rectangle ABCD



[b] Find the equation of the straight line passing through the point (1, 2) and perpendicular to the straight line  $x + 3y + 7 = 0$

5 [a] Prove that the points A (3, -1), B (-4, 6), C (2, -2) which belong to a perpendicular coordinates plane lie on the circle whose centre is the point M (-1, 2), then find the area of the circle.

[b] Find the slope and the intercepted part of y-axis by the straight line where its equation is  $4x + 5y - 10 = 0$

## 20 Qena Governorate



Answer the following questions :

1 Choose the correct answer from those given :

1  $\sin 30^\circ = \dots\dots\dots$

(a) 1

(b)  $\frac{\sqrt{3}}{2}$

(c)  $\cos 60^\circ$

(d)  $\frac{1}{\sqrt{2}}$

2 The number of diagonals of the hexagon equals .....

(a) 5

(b) 6

(c) 2

(d) 9

3 If O the origin point is the midpoint of  $\overline{AB}$  as  $A = (-2, 5)$ , then  $B = \dots\dots\dots$

(a) (2, 5)

(b) (2, -5)

(c) (-2, 5)

(d) (-2, -5)

4 If the measure of two angles of a triangle are  $70^\circ$ ,  $40^\circ$ , then the number of its axes equals .....

(a) 1

(b) 2

(c) 3

(d) zero

5 If  $L_1$ ,  $L_2$  are two parallel straight lines of slopes  $m_1$ ,  $m_2$  respectively, then .....

(a)  $m_1 - m_2 = \text{zero}$

(b)  $m_1 = -m_2$

(c)  $m_1 \times m_2 = 1$

(d)  $m_1 \times m_2 = -1$

6 If the lengths of two sides of a triangle are 2 cm., 5 cm., then the length of the third side can be .....

(a) 2 cm.

(b) 3 cm.

(c) 4 cm.

(d) 1 cm.

2 [a] Without using calculator, find the value of :  $\cos 60^\circ \sin 30^\circ - \sin 60^\circ \cos 30^\circ$

[b] Find the equation of the straight line which makes with the positive direction of x-axis a positive angle of measure  $135^\circ$  and intercepts from the positive part of y-axis a part of length 5 length units.

3 [a] Prove that the points A (1, 4), B (-1, -2), C (2, -3) are the vertices of a right-angled triangle, find its area.

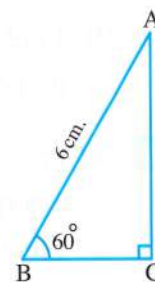
## Trigonometry and Geometry

### [b] In the opposite figure :

$\Delta ABC$  is a right-angled triangle at C

,  $AB = 6 \text{ cm.}$  ,  $m(\angle B) = 60^\circ$

**Find :** The length of  $\overline{AC}$



- 4 [a] Find the slope of the straight line whose equation is :

$2x - 6y = 12$  , then find the points of intersection with the coordinates axes.

- [b] Without using calculator , find the value of  $X$  (where  $X$  is the measure of an acute angle) that satisfies :  $\tan X = 4 \cos 60^\circ \sin 30^\circ$

- 5 [a] Prove that the straight line which passes through the two points  $(1, 3)$  ,  $(2, 4)$  is parallel to the straight line whose equation is :  $y - x = 5$

- [b] Prove that the figure ABCD is a rectangle where  $A(1, 0)$  ,  $B(-1, 4)$  ,  $C(7, 8)$  ,  $D(9, 4)$

## 21 Luxor Governorate



**Answer the following questions :**

### 1 Choose the correct answer :

- [1] The length of the side opposite to the angle of measure  $30^\circ$  in the right-angled triangle equals ..... the length of the hypotenuse.  
 (a) quarter.                      (b) twice.                      (c) half.                      (d) third.
- [2] If  $\tan(2X - 5) = 1$  where  $X$  is the measure of an acute angle , then  $X =$  .....  
 (a)  $15^\circ$                       (b)  $75^\circ$                       (c)  $50^\circ$                       (d)  $25^\circ$
- [3] If the diagonal length of a square is 10 cm. , then its area = .....  $\text{cm}^2$ .  
 (a) 100                      (b) 75                      (c) 50                      (d) 25
- [4] The straight line passing by the two points  $(0, 0)$  ,  $(2, 3)$  is parallel to the straight line whose slope is .....  
 (a)  $\frac{3}{2}$                       (b)  $\frac{2}{3}$                       (c)  $-\frac{3}{2}$                       (d)  $-\frac{2}{3}$
- [5] The image of the point  $(3, -2)$  by reflection in the  $X$ -axis is .....  
 (a)  $(-2, 3)$                       (b)  $(3, 2)$                       (c)  $(2, -3)$                       (d)  $(-3, -2)$
- [6] The slope of the straight line  $x - 5 = 0$  is .....  
 (a) 5                      (b)  $\frac{1}{5}$                       (c) zero                      (d) undefined.



- 2 [a]** Find in degrees the value of  $X$  if :  $\tan 2X = 4 \sin 30^\circ \cos 30^\circ$  where  $0^\circ < X < 90^\circ$
- [b]** Find the equation of the straight line passing by the point  $(3, 5)$  and is parallel to the straight line  $2x - 3y + 6 = 0$
- 3 [a]** Prove that the straight line passing by the two points  $(7, -3)$ ,  $(5, -1)$  is perpendicular to the straight line which makes an angle of measure  $45^\circ$  with the positive direction of  $X$ -axis.
- [b]** Without using the calculator, prove that :  $2 \sin 30^\circ + 4 \cos 60^\circ = \tan^2 60^\circ$
- 4 [a]** If the distance between the points  $(a, 0)$ ,  $(0, 1)$  equals  $\sqrt{2}$  length unit, find a
- [b]** If  $\overline{AB}$  is a diameter in the circle  $M$  where  $A(4, -1)$ ,  $B(-2, 7)$ , find the coordinates of the point  $M$  and the radius length of the circle.
- 5 [a]** Prove that the points  $A(-1, -4)$ ,  $B(1, 0)$ ,  $C(2, 2)$  are collinear.

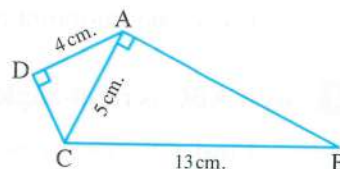
**[b]** In the opposite figure :

$$m(\angle ADC) = m(\angle BAC) = 90^\circ$$

$$AD = 4 \text{ cm.}, AC = 5 \text{ cm.}, BC = 13 \text{ cm.}$$

Find the value of :

$$\tan(\angle DAC) \sin(\angle ACB) - \sin(\angle B) \cos(\angle CAD)$$



## 22 Aswan Governorate



Answer the following questions : (Calculator is allowed)

- 1** Choose the correct answer from those given :
- 1** The measure of the exterior angle of the equilateral triangle is .....°
- (a) 60                      (b) 90                      (c) 120                      (d) 180
- 2**  $4 \sin 30^\circ \cos 60^\circ = \dots\dots\dots$
- (a) 1                      (b) 2                      (c) 3                      (d) 4
- 3** The length of the opposite side of the angle with measure  $30^\circ$  in the right-angled triangle equals ..... the length of the hypotenuse.
- (a)  $\frac{1}{4}$                       (b)  $\frac{1}{3}$                       (c)  $\frac{1}{2}$                       (d)  $\frac{3}{4}$

## Trigonometry and Geometry

- 4 The equation of the straight line passing through the point  $(-2, -3)$  and parallel to  $X$ -axis is .....
- (a)  $y = -2$       (b)  $y = -3$       (c)  $X = -2$       (d)  $X = -3$
- 5  $\triangle ABC$  is an isosceles triangle in which  $AB = 3$  cm. ,  $BC = 7$  cm. , then  $AC =$  ..... cm.
- (a) 3      (b) 4      (c) 7      (d) 10
- 6 The distance between the two straight lines  $X - 2 = 0$  ,  $X + 3 = 0$  equals ..... length units.
- (a) 1      (b) 2      (c) 3      (d) 5
- 
- 2 [a] Find the equation of the straight line which passes through the two points  $(1, 3)$  ,  $(-1, -3)$
- [b] Prove that the points  $A(3, -1)$  ,  $B(-4, 6)$  ,  $C(2, -2)$  lie on the circle whose centre is  $M(-1, 2)$  , then find the circumference of the circle.
- 
- 3 [a] Without using calculator , find the measure of  $\angle E$  (Such that  $E$  is an acute angle) if :  $2 \sin E = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$
- [b] If  $C$  is the midpoint of  $\overline{AB}$  , then find  $X, y$  where  $A(X, 3)$  ,  $B(6, y)$  ,  $C(4, 6)$
- 
- 4 [a]  $\triangle ABC$  is right-angled at  $C$  in which  $AC = 6$  cm. ,  $BC = 8$  cm.
- Find : 1  $\cos A \cos B - \sin A \sin B$       2  $m(\angle B)$
- [b] If the straight line  $L_1$  passes through the two points  $(3, 1)$  ,  $(2, k)$  and the straight line  $L_2$  makes with the positive direction of the  $X$ -axis an angle of measure  $45^\circ$  , find the value of  $k$  if the two straight lines are : 1 Parallel. 2 Perpendicular.
- 
- 5 [a] Find the equation of the straight line which passes through the point  $(3, -5)$  and is parallel to the straight line  $X + 2y - 7 = 0$
- [b] Find the value of  $X$  if :  $X \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

23

North Sinai Governorate



Answer the following questions :

- 1 Choose the correct answer from those given :
- 1 If  $a = b$  ,  $a, b$  are the measures of two complementary angles , then  $a =$  ..... $^\circ$
- (a) 30      (b) 45      (c) 60      (d) 90

2 If  $\tan 3X = \sqrt{3}$ , where  $X$  is the measure of an acute angle, then  $X = \dots\dots\dots^\circ$

- (a) 10 (b) 20 (c) 30 (d) 60

3 The sum of measures of the interior angles of the quadrilateral equals  $\dots\dots\dots^\circ$

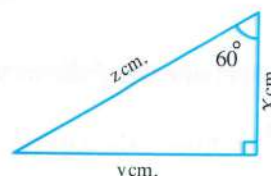
- (a) 360 (b) 180 (c) 90 (d) 540

4 If  $A(1, -6)$ ,  $B(9, 2)$ , then the midpoint of  $\overline{AB}$  is  $\dots\dots\dots$

- (a)  $(-2, 5)$  (b)  $(2, -5)$  (c)  $(5, -2)$  (d)  $(-5, 2)$

5 In the opposite figure :

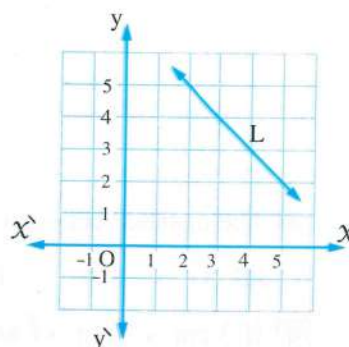
- (a)  $X + y = z$  (b)  $z = X^2 + y^2$   
(c)  $2X = z$  (d)  $y = \frac{1}{2}z$



6 In the opposite figure :

$L$  is a straight line passing through the two points  $(2, 5)$ ,  $(5, 2)$ , then the point  $\dots\dots\dots \in L$

- (a)  $(1, 6)$  (b)  $(2, 3)$   
(c)  $(0, 0)$  (d)  $(3, -4)$



2 [a] Without using the calculator, prove that :  $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$

[b] ABCD is a quadrilateral, where  $A(2, 4)$ ,  $B(-3, 0)$ ,  $C(-7, 5)$ ,  $D(-2, 9)$   
Prove that : ABCD is a square.

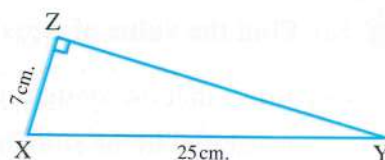
3 [a] Find the equation of the straight line whose slope is 3 and passes through the point  $(5, 0)$

[b] In the opposite figure : XYZ is a right-angled triangle at Z

,  $XZ = 7$  cm.,  $XY = 25$  cm.

1 Find the value of :  $\tan X \times \tan Y$

2 Prove that :  $\sin^2 X + \sin^2 Y = 1$



4 [a] Without using the calculator, find the value of  $X$  if :  $2 \sin X = \tan^2 60^\circ - 2 \tan 45^\circ$   
where  $X$  is the measure of an acute angle.

[b] Prove that the points  $A(-1, -4)$ ,  $B(1, 0)$ ,  $C(2, 2)$  are collinear.



- 5 [a] Prove that the straight line passing through the two points  $(-3, -2)$ ,  $(4, 5)$  is parallel to the straight line which makes with the positive direction of the  $X$ -axis an angle of measure  $45^\circ$
- [b] If the straight line passing through the two points  $(-2, 3)$ ,  $(1, k)$  is perpendicular to the straight line whose slope equals  $-3$ , then find the value of  $k$

## 24 Red Sea Governorate

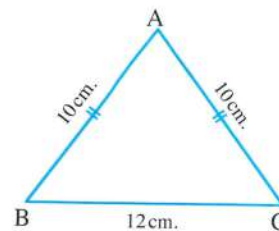


Answer the following questions :

- 1 Choose the correct answer from those given :
- [1]  $2 \sin 30^\circ = \dots\dots\dots$
- (a)  $\frac{1}{2}$  (b)  $\frac{\sqrt{3}}{2}$  (c) 1 (d) 2
- [2] The measure of the exterior angle of the equilateral triangle equals  $\dots\dots\dots$
- (a)  $30^\circ$  (b)  $60^\circ$  (c)  $90^\circ$  (d)  $120^\circ$
- [3] The distance between the point  $(3, 4)$  and the point of origin equals  $\dots\dots\dots$  length units.
- (a) 3 (b) 4 (c) 5 (d) 7
- [4] If 3 cm., 7 cm.,  $l$  are the lengths of the sides of a triangle, then  $l$  can be equal to  $\dots\dots\dots$  cm.
- (a) 3 (b) 7 (c) 4 (d) 10
- [5] If  $\overrightarrow{AB} \perp \overrightarrow{CD}$  and the slope of  $\overrightarrow{AB} = \frac{2}{3}$ , then the slope of  $\overrightarrow{CD} = \dots\dots\dots$
- (a)  $\frac{2}{3}$  (b)  $-\frac{2}{3}$  (c)  $\frac{3}{2}$  (d)  $-\frac{3}{2}$
- [6] The image of the point  $(3, -2)$  by reflection in the origin point is  $\dots\dots\dots$
- (a)  $(-3, 2)$  (b)  $(-3, -2)$  (c)  $(3, 2)$  (d)  $(-2, 3)$
- 
- 2 [a] Find the value of :  $\cos 60^\circ \sin 30^\circ - \sin 60^\circ \tan 60^\circ + \cos^2 30^\circ$
- [b] Prove that the straight line which passes through the two points  $(-3, -2)$ ,  $(4, 5)$  is parallel to the straight line which makes an angle of measure  $45^\circ$  with the positive direction of the  $X$ -axis.
- 
- 3 [a] Find the slope of the straight line  $3x + 4y - 5 = 0$ , then find the length of the intercepted part from  $y$ -axis.
- [b] Find the value of  $x$  where :  $x \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

**4 [a] In the opposite figure :**

ABC is a triangle in which  $AB = AC = 10$  cm.  
 ,  $BC = 12$  cm.



**1 Find :**  $m(\angle B)$

**2 Prove that :**  $\sin^2 B + \cos^2 B = 1$

**[b]** Prove that the triangle whose vertices are  $A(1, 4)$  ,  $B(-1, -2)$  ,  $C(2, -3)$  is right-angled , then find its area.

**5 [a] Find the equation of the straight line which passes through the point**

$A(4, 6)$  and the midpoint of  $\overline{BC}$  where  $B(3, 7)$  ,  $C(1, -3)$

**[b]** ABCD is a parallelogram where  $A(3, 3)$  ,  $B(2, -2)$  ,  $C(5, -1)$   
 , M is the intersection point of its diagonals. **Find :**

**1** The coordinates of M

**2** The coordinates of D

**25 Matrouh Governorate**



**Answer the following questions :** (Calculator is allowed)

**1 Choose the correct answer from those given :**

**1** The area of the square whose perimeter is 16 cm. equals .....  $\text{cm}^2$

- (a) 4                      (b) 8                      (c) 16                      (d) 256

**2** The equation of the straight line whose slope is 1 and passes through the origin point is .....

- (a)  $x = 1$                       (b)  $y = 1$                       (c)  $y = x$                       (d)  $y = -x$

**3** If  $\cos 2x = \frac{1}{2}$  , then  $x =$  .....

- (a)  $15^\circ$                       (b)  $30^\circ$                       (c)  $45^\circ$                       (d)  $60^\circ$

**4** A right circular cylinder , if its height equals the length of its base radius =  $r$  cm.  
 , then its volume = .....  $\text{cm}^3$

- (a)  $\pi r^3$                       (b)  $2\pi r^2$                       (c)  $2\pi r^3$                       (d)  $\frac{4}{3}\pi r^3$

**5** The slope of the straight line which is parallel to the  $x$ -axis is .....

- (a) -1                      (b) zero                      (c) 1                      (d) undefined.

**6 In the opposite figure :**

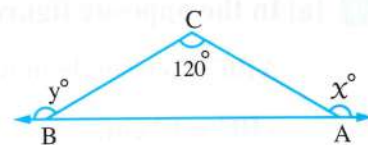
If  $m(\angle C) = 120^\circ$   
 , then  $x^\circ + y^\circ = \dots\dots\dots$

(a)  $90^\circ$

(b)  $180^\circ$

(c)  $300^\circ$

(d)  $360^\circ$


**2 [a] Without using calculator , find the value of  $x$  if :  $4x = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$** 

**[b]**  $\overline{AB}$  is a diameter of the circle  $M$  , if  $B(8, 11)$  ,  $M(5, 7)$

, find : **1** The coordinates of  $A$

**2** The length of the radius of the circle.

**3 [a] Prove that the points  $A(-2, 5)$  ,  $B(3, 3)$  ,  $C(-4, 2)$  are not collinear and if  $D(-9, 4)$  , prove that the figure  $ABCD$  is a parallelogram.**

**[b] Explaining the steps and without using calculator , find :**

$$\frac{\cos^2 60^\circ + \cos^2 30^\circ - \tan^2 45^\circ}{\sin 60^\circ \tan 60^\circ - \sin 30^\circ}$$

**4 [a] Find the equation of the straight line which passes through the point  $(3, 4)$  and is perpendicular to the straight line  $5x - 2y + 7 = 0$** 

**[b]**  $ABCD$  is an isosceles trapezoid ,  $\overline{AD} \parallel \overline{BC}$  ,  $AD = 4$  cm. ,  $AB = 5$  cm.  
 where  $BC = 12$  cm.

**Prove that :**  $\frac{5 \tan B \cos C}{\sin^2 C + \cos^2 C} = 3$

**5 [a] If the straight line  $L_1$  passes through the two points  $(3, 1)$  ,  $(2, k)$  and the straight line  $L_2$  makes with the positive direction of the  $x$ -axis an angle whose measure is  $45^\circ$   
 , then find  $k$  if the two straight lines  $L_1$  ,  $L_2$  are :**

**1** Parallel.

**2** Perpendicular.

**[b] Find the slope and the intercepted part of  $y$ -axis by the straight line :  $2x = 3y + 6$**



# كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9

